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OCTOBER 12, 1992 | THE VOICE OF PERSONAL COMPUTING IN THE ENTERPRISE | VOLUME 14, ISSUE 41

IN THE ENTERPRISE

Downsizing with NetWare

IS managers can let go of the mainframe mindset and downsize critical applications to the LAN.

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PRODUCT ANALYSIS

X.400 mail gateways

Connecting disparate E-mail is a daunting project. See page 85

Product Comparison

Quattro Pro, 1-2-3 close gap on Excel

The Windows spreadsheet race has tightened up like a startled potato bug. Using a new methodology focused on how well products perform the most common business tasks, the *InfoWorld* Test Center found that Microsoft Excel is no longer well ahead of the competition. Borland's new Quattro Pro for Windows is just four-tenths of a point behind, and Lotus 1-2-3 for Windows has closed to just over a one-point gap behind Excel. The new *InfoWorld* methodology does not penalize a product for lacking a feature, per se. Rather, the comparison (on page 104) focuses on the effectiveness of each product's unique approach to the spreadsheet tasks identified as most important to *InfoWorld* readers.

Novell blocks free BBS support

New licensing, pricing policies could reduce options and increase fees

BY VANCE MCCARTHY AND SHAWN WILLETT

Users may be forced to pay for patches, enhancements, and bug fixes to all Novell Inc. products under a new technical support plan the company is currently drawing up, said sources close to the project.

Novell's proposed move would give a handful of commercial database services exclusive distribution of Novell technical updates, and wipe out a cottage industry of small BBS operators who have traditionally distributed them to users either free or for a small fee. And many users aren't happy about that.

"It will reduce most people's access to upgrades, and I can't see that it would provide much revenue [for Novell]," said Mike Avery, network administrator at the Texas Department of Human Services, in Austin, Texas.

"I put in a great amount of time. If they try to charge me, I will terminate the service," said Aaron Cleaver, president of the Austin NetWare Forum.

The specter of higher charges and restricted access for support comes as the Provo, Utah-based networking giant prepares to introduce at NetWorld its most support-intensive products yet. At the show, Novell will demonstrate and likely give formal ship dates for NetWare 4.0, SFT-III, NetWare Management System, and NetWare Global Messaging. (See chart.)

Under the proposed plan, Novell will charge resellers and

See SUPPORT, page 151

Novell NetWorld debuts

NetWare 4.0 – Novell's first distributed operating environment for the enterprise. Includes directory services, C2 security, authentication. **Availability: late 1992-early 1993**

SFT-III – Novell's first fault-tolerant support for data integrity and on-line maintenance. Designed for NetWare 3.x and above. **Availability: early 1993**

NetWare Global Messaging – Novell's first cross-platform, NLM-based message platform. First modules support Unix, TCP/IP, IBM, X.400, and OSI protocols. **Availability: now**

NetWare Management System – Novell's first management platform for mapping, directory, asset management, and monitoring. **Availability: now through 1993**

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IBM will use multimedia in all its systems by 1994

BY ED SCANNELL

Within two years IBM will incorporate at least basic multimedia components into its lowest cost systems such as the Value Point and PS/1s, said Robert Corrigan, the new president of IBM's Personal Computer Co.

IBM presently offers multimedia capabilities only in its recently announced line dedicated to that market. But the company will trickle the technology down to $1,000 desktop machines in less than two years.

"You'll see it go from the multimedia machines to the Premium machines to the Value Point machines to the consumer

See IBM, page 151

Robert Corrigan, president of IBM Personal Computer Co.

ODBC moves across platforms

Pioneer drivers will link it to DOS, OS/2, Unix, Mac

BY SCOTT MACE AND STUART J. JOHNSTON

Pioneer Software last week committed to delivering tools that give applications on various operating systems parity with a growing Windows database client standard.

The Raleigh, N.C.-based company said it is developing Open Database Connectivity drivers for DOS, Unix, OS/2, the Mac, and Windows NT.

The ODBC technology, which was created by Microsoft and an industry consortium, aims to provide users with a standardized means of accessing data in diverse products, including PC and Structured Query Language (SQL) databases.

Microsoft has been criticized for not explaining how users would get ODBC links to non-Windows clients and servers. But the company, which officially ships the ODBC Software Development Kit today, said

See ODBC, page 151

Kaleida to demo link between IBM's video server, PCs, Macs

Networked multimedia show slated for Comdex

BY ED SCANNELL AND TOM QUINLAN

IBM, Kaleida, and Apple Computer Inc. hope to unveil at fall Comdex the first Kaleida product working in conjunction with IBM's video server prototype in a cross-platform, networked multimedia demonstration.

The three companies are anxious to showcase the viability of networked multimedia, as well as the first tangible result of the Apple/IBM alliance, sources said.

IBM's video server will be a RISC-based system running AIX, with the capability to run production-level Digital Video Interactive-encoded video files across a network, sources said.

"It's very important to IBM that they present an enterprise message for multimedia," said Richard Doherty, editor of *Envisioneering*, a newsletter on digital video and communications based in Seaford, N.Y.

"A video server with cross-platform capabilities and the ability to transfer data across a network without bogging it down completely will help give multimedia a stronger business presence," Doherty said.

In addition to providing a development platform for the

See KALEIDA, page 151

What you wanted was data security. What you got was a pain in the neck.

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NEWS

PageMaker 5.0 threatens XPress with 'robust control'

Insiders praise improvements

BY JEANETTE BORZO

PageMaker 5.0 is garnering a favorable response from industry insiders, who say its new features make it a strong rival to QuarkXPress in the high-end graphics market. The new version of PageMaker is set to ship in January for Windows and in February for the Macintosh.

"I think [Aldus Corp.] is aiming 5.0 right at the heart of QuarkXPress," said Jesse Berst, editor and publisher of *Windows Watcher*, in Redmond, Wash. "They are dedicated to becoming the product of choice for the graphic arts professional. I think they have answered many of the questions, especially when they couple it with the trouble Quark is having in releasing a competitive Windows product."

It looked like Quark Inc. would beat Aldus to the punch when it announced plans to release a Windows product in April of this year. But since that time, QuarkXPress' ship date has slipped several times. The last update to PageMaker for Windows was in February 1991.

New features of PageMaker 5.0

- Multiple open documents
- Option to group and move text and graphics
- Object Linking and Embedding client
- Color separations as a menu option
- Skewing and rotating of text and graphics
- Support for TWAIN and Kodak Photo CD formats and Pantone, Trumatch, Focaltone, and Toyo color models
- Option to share kerning information between documents and platforms
- Option to access control palette functions through keyboard shortcuts

Both versions of PageMaker will offer identical features.

"You ought to see the control palette now," said one source. "It does all kinds of stuff like setting leading and kerning. It's a much more robust control palette — more robust than Quark's."

Users will be able to group elements on a page and then move the items, similar to how objects are grouped and moved in most graphics packages.

Aldus has improved color handling, adding support for Pantone, Trumatch, Focaltone, and Toyo models. Users can rotate and skew text and graphics at any angle and can share kerning information between documents and platforms.

The $795 program offers context-sensitive help and color separations. "That is a major improvement," a source said.

Printing has been sped up substantially, sources said, and users can interrupt the screen redraw — a feature not currently available to Windows users. "It doesn't seem like a big deal until you actually use it," a source said.

PageMaker 5.0, an Object Linking and Embedding client, offers TWAIN and Kodak Photo CD support and lets users open multiple documents.

Aldus declined comment.

IBM debuts low-cost line in Europe first

BY ED SCANNELL AND JAYNE WILSON

IBM Corp. last week used Europe as the launch site for its long-rumored Value Point PCs, which are designed to compete with low-cost clones. But analysts were skeptical about the line's chances for success when it hits these shores in two weeks.

This announcement brings IBM in line with the industry in terms of price and configuration.

Frank Dzubeck

The new line, on which IBM is pinning its hopes for a U.S. comeback, could enter the market here at below $1,000 for a 25-MHz 386SLC-based system.

"Overall the line looks good," said Randy Giusto, senior analyst at Workgroup Technologies Inc., in Hampton, N.H. "It has a solid feature set. However, there is very little differentiation between this line and PCs from vendors such as AST and Dell."

Although the systems for now make IBM more competitive with low-cost clone makers, it remains unclear whether IBM can regain lost customers.

"This announcement brings IBM in line with the industry in terms of their price points and configuration structures," said Frank Dzubeck, president of Communications Network Architects Inc., consultants in Washington, D.C. "The issue becomes whether they can move these PCs through the channel."

The new line is set apart from previous IBM offerings in that the monitors are bundled in the base price and the systems will be the first sold through an 800 number, Giusto noted. Some industry watchers think the pricing differential in the U.S. market could be $100 to $300 lower.

The new systems, which will have different model names in the U.S., come in four groups called the C, F, M, and W series. At the low end, the C series starts with the 25-MHz 386SLC-based system, which has 2 megabytes of memory and an 80-megabyte hard drive and is priced in Britain at 720 pounds, or $1,226 in U.S. dollars.

The F, M, and W lines give users a choice of 4, 8, or 16 megabytes of RAM and are priced in various configurations from $1,601 to $2,700. The dual-speed W series starts with 4 megabytes of memory and up to a 212-megabyte hard drive and costs the equivalent of $2,700.

— Martin LaMonica of IDG News Service contributed to this story.

AT DEADLINE

Intel's 486SL to drive low-power notebooks

Intel Corp. plans to introduce next month a power miser 486 microprocessor, according to sources familiar with the chip. The Intel 486SL will incorporate power management features found in the company's 386SL microprocessor. The processor will run at 3.3 volts, so it will consume even less power. Although Intel claims the processor will yield 12 hours of battery life, system vendors say it is unlikely notebooks using the chip will run that long because LCD screens and hard drives cannot run at 3.3 volts.

— Yvonne Lee

UnixWare expected by end of year

Univel last week revealed end-user pricing for its UnixWare product and announced it plans to ship the core UnixWare product by December. A single-user version with NetWare lists for $495. An unlimited server version with NetWare, TCP/IP, and IPX/SPX lists for $2,495. Both include DOS emulation. If users want multiuser Windows emulation, they'll pony up $995 for a separate module.

— Cate Corcoran and Cheryl Gerber

Borland's stock takes a beating

Borland International's stock took a severe beating last week as Wall Street analysts questioned the sales of newly released Quattro Pro for Windows, fretted about the possible late release of Paradox for Windows, and worried over earnings prospects. Borland stock fell 26 percent in two days, hitting $27.63 by the close of the market Thursday. In January, the stock hit a peak of $86 per share.

Wall Street was also nervous about today's spreadsheet review in *InfoWorld*. Borland officials said. Some analysts, Borland said, were expecting Quattro Pro to lose in the review to Microsoft's Excel.

Borland president Philippe Kahn told analysts that current quarter earnings will be within expectations. The company also said that it is too early to evaluate sales of Quattro Pro for Windows.

Northgate laptops debut at Comdex

A new line of notebook systems from Northgate Computer Corp. will be introduced at fall Comdex, with systems priced from approximately $2,200 to $5,000. The basic system will include a 25-MHz 486SX, 4 megabytes of RAM, and a 120-megabyte hard drive. At the high end, Northgate is expected to offer the same system with a VGA-compatible active matrix color screen, sources said.

— Tom Quinlan

LAN Server 3.0 debuts in Europe

A week before its U.S. announcement at NetWorld, IBM's LAN Server 3.0 was unveiled in Europe by IBM United Kingdom Ltd. The new version, rewritten to take advantage of OS/2 2.0, allows connection of Macintosh and TCP/IP workstations, and also gains the ability to share 3270 connections among DOS, Windows, and OS/2-based applications. The product is expected to ship in December, IBM U.K. officials said.

— Cara A. Cunningham, IDG News Service

Compaq lays off 700 as sales boom

More than 700 Compaq Computer Corp. employees will be laid off this month, despite a record-breaking quarter in revenues and units sold by the Houston-based company. Giancarlo Bissone, vice president of North American sales, said Compaq was laying off the employees — with 300 more to follow in the next couple of months — because the company doesn't see any slackening of the price wars that have raged the last 18 months. "This is a proactive rather than a reactive move by Compaq," Bissone said. Compaq is expected to release third-quarter results on October 20.

— Tom Quinlan

Editorial / Stewart Alsop

Check out our new approach to product comparisons

We are really proud of ourselves this week because we think we have made a step forward in our drive to become a better newspaper for New Age IS managers (that's you). So we would like your help in letting us know whether we should be so proud or not.

This week we are publishing two product comparisons: "Opening the windows on spreadsheets," page 104; and "What we have here is a failure to communicate," page 85. Both of these product comparisons introduce new ideas in product testing that we believe will be more informative and useful for your own evaluations.

The comparison of Windows spreadsheets — Lotus 1-2-3, Quattro Pro, and Microsoft Excel — evaluates packaged applications designed for individual users of a personal computer. That "traditional" focus is the kind of product coverage we have had for more than a decade, and that has been the key to our success. (Indeed, we have gained enough of a reputation for doing this kind of product evaluation that at least one Wall Street analyst noted our upcoming comparison with some anxiety last week.)

But this comparison also incorporates a new approach to testing. The spreadsheet comparison uses a new suite of tests, which is described in an article that accompanies the comparison. The fundamental idea is to test products for how well they do what users use them for, not for whether they have all the politically correct features.

We know this seems to be an obvious idea, but the computer publications that test products tend to focus on product features — recale speed, hard disk speed, or speed of painting pixels on a screen. Although these performance tests may reflect some raw technical features of a product, they do not necessarily reflect a product's relevance to getting a given job done.

We will be integrating our new task-oriented approach into all of our product testing over the next year.

Our X.400-based electronic mail gateways comparison is a major step forward in delivering enterprise-oriented testing. We have been struggling for the past two years with the problem of how to "test" enterprise systems. We've been studying how to provide readers — who are increasingly responsible for networked systems — with useful comparative product information. One thing we know is that you don't pop a floppy disk in and run a "benchmark" program.

Our answer is to test specific components of the system, such as gateways or network protocol analyzers (as we did recently). The X.400 comparison is a first for us, as it takes our considerable testing talents beyond the desktop to components that end-users may never see.

Other new features we plan to introduce this fall will complete the portfolio of tools for the New Age systems manager. For now, though, we are pretty happy with ourselves. We hope you will read these product comparisons carefully and tell us exactly what you think, even if that means sticking a pin in our little balloon.

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INFO WORLD

POSTAL INFORMATION: Second-class postage paid at San Mateo, CA and additional mailing offices. InfoWorld (ISSN 0199-6649) is published weekly, except for a combined Christmas/New Year's issue, by InfoWorld Publishing Inc. 155 Bovet Road, Suite 800, San Mateo, CA 94402, (415) 572-7341. InfoWorld and Enterprise Computing are trademarks of InfoWorld. Copyright 1992 by InfoWorld Publishing Inc. All rights reserved. Reproduction of material appearing in InfoWorld is forbidden without written permission.The price of a one-year subscription to InfoWorld is $110 for subscribers in the U.S. and $125 in Canada. POSTMASTER: Send change of address to InfoWorld, P.O. Box 1172 Skokie, IL 60076. InfoWorld Subscriber services may be reached at this same address, or by calling (800) 457-7866 or (708) 647-7925.

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IBM prepares to release package of fixes to 240 OS/2 bugs

IBM will release next week its first major program to stamp out an unusually high number of bugs in its OS/2 2.0 operating system. The Service Pak contains 240 fixes.

Among the fixes and new features contained in the Service Pak are the 32-bit graphics engine, seamless Windows support for XGA and Super VGA graphics, performance improvements to the program's Dynamic Data Exchange and clipboard functions, and various fixes to glitches in the WorkPlace Shell.

IBM plans to release by year end a new release of the program that contains support for Windows 3.1, bundled with the graphical engine and all the fixes contained in the Service Pak, said Steve Woodward, lead programmer on OS/2's 32-bit graphical engine.

Also included in the refresh version will be support for several more Super VGA chip sets.

The Service Pak, which can be installed over the existing version, will be available first through CompuServe and other bulletin boards. Later, it will be available on disks through the company's 800 number for a nominal fee.

— Ed Scannell

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Corel races to shore up support line

BY JEANETTE BORZO AND SHAWN WILLETT

Corel Corp. is scrambling to fix CorelDraw 3.0 consumer support problems as it prepares for its first U.S. stock offering.

A Corel official, who asked not to be named, conceded last week that the company's technical support was overtaxed by the unexpected strong sales of CorelDraw 3.0.

"Our technical support calls have almost doubled," the source said. "The response to Corel 3.0 was overwhelming. In the current business environment, that was not something we could count on."

"It used to be you could call them," said Mike Rasor, owner of Rasor & Associates, in Coeur d'Alene, Idaho. "Now you can hold on for days."

Corel expanded its support hours to continuous service from 5 a.m. Monday to 5 a.m. Saturday.

Since CorelDraw 3.0 shipped in May, Corel has released two bug fixes to the Windows-based graphics package, which now offers new modules for presentations, image editing, and charting.

Many users and sources expressed confidence in Corel. "They recognize there is a problem, and I know they ▶ addressing it," said Bruce Wasserman, a CorelDraw user and product development vice president at Telecraft Industries, in New York.

Corel officials refused to officially comment because the company is in a "quiet period" before the stock offering. Corel is expected to formally start trading about 2 million shares in the United States next week.

Corel has boomed during a period of lackluster sales for most software companies. Revenues have almost doubled from $14.7 million (Canadian) in the fourth quarter of last year to $27.5 million in the current fourth quarter, analysts said.

Corrections

In our July 6 comparison of document management systems, we implied PC Docs relied solely on Bitrieve, when it actually has a separate full-text engine. We also were mistaken when we said that PC Docs 4.1 was incapable of combining the date-range search criteria from its document profile screen with full-text search criteria. As a result, PC Docs' score in full-text search improves to 6.0, and its overall score improves to 6.2. PC Docs also earned the *InfoWorld* Buyers Assurance Seal.

In the September 28 database comparison, the multiuser price for FoxPro should have been $895 for six additional user licenses. Also, FoxPro's support policies now merit a score of excellent, which raises its final score to 7.3.

The remote access story on page 58 of the October 5 issue ("Remote access networking: riding the wave of portability") incorrectly listed the price for Norton-Lambert's Close-Up 4.0. The price of the program is $199.

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Apple's October surprise...

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IIvi: 16-MHz 68030			$2,200

POWERBOOKS

180: 33-MHz 68030	4MB/80MB	video (out) active matrix gray scale	$2,400
160: 25-MHz 68030		video (out) passive matrix gray scale	$2,200

DUO

210: 25-MHz 68030	4MB of RAM 40/120MB drive	connection to one of two docking stations that provide slots, floppy drives, video out,and networking; 4 ½ pounds	$2,400
230: 33-MHz 68030			$2,900

SYSTEMS SOFTWARE

QuickTime 1.5 Doubles top-of-the-line compression and frame rate to 30 frames per second at a resolution of 320 by 240

On October 19, Apple will revamp its expandable Macintosh line with two three-slot systems, the IIvx and the IIvi, to replace the venerable IIci and IIsi. At the same time Apple will introduce more powerful PowerBooks at lower prices.

Incomplete SDKs slow NMS software developers

By Torsten Busse

Users anxious to install Novell Inc.'s NetWare Management System (NMS) as their central LAN management console should not expect to have a fully functional platform available before mid-1993, sources said.

Although Novell promised to ship NMS in April, in the past few months the company has delivered in piecemeal fashion the necessary developer kits for the Windows version of NMS. The success of NMS is dependent on integration of third-party tools into the platform.

"We haven't been able to create our snap-in module because all the pieces aren't there yet," said a developer, who would not speculate on when his company will be able to deliver compliant products.

"Version 1.0 of NMS was so buggy you couldn't do anything with it," another developer said. "It was unreliable and not dependable."

Novell officials said the company has stepped up its efforts to support developers. "We now have two people [instead of one] in charge of developers' contacts, and the whole Austin group is working on it, " said Jeff Turner, Novell product manager. "In two weeks the final part of the SDK — the application integrator — will ship, which completes the set."

"The baseline products have been out there for a long time, allowing developers to start developing," Turner said. Several companies, including Compaq, Network, StonyBrooks, Microcom, and Brightwork Development have announced ship dates for NMS products.

However, when NMS was announced in February more than 50 developers supported the platform. *InfoWorld* contacted a dozen vendors and found that, with few exceptions, they are far from shipping any NMS-compliant products.

Novell last week also began shipping an enhanced 1.1 version of the NetWare Service Manager for Windows. In addition Novell said it licensed the OS/2 version of NMS to IBM for integration into the new OS/2-based management platform. (See related story, this page.)

Analysts lauded the move, which will allow Novell to better focus its resources on the Windows version of NMS. Jamie Lewis of the Burton Group, in Salt Lake City, said Novell so far had no coherent strategy for the Windows and OS/2 versions of NMS. "They had two competing development groups within the company who were fighting over it."

BeyondMail for Notes sets sights on upstaging cc:Mail

Full-featured application touts superior customizability

By Cheryl Gerber

Hoping to drive a wedge between Lotus Development Corp.'s Notes and cc:Mail products before they are integrated, Beyond Inc. this week at Net-World will push out a full-featured E-mail package for Notes.

BeyondMail for Lotus Notes can also serve as an alternative to the Notes Mail front end that comes bundled with Notes.

"The main focus is the customer who has Notes and hasn't decided on an enterprisewide [E-mail system]," said Eugene Lee, Beyond's director of product planning. "Functionality-wise, we are usurping cc:Mail. BeyondMail is more customizable and easier to use than cc:Mail. We're also hoping it will replace Notes Mail," Lee said.

BeyondMail for Notes lets Lotus Notes users filter Notes databases and E-mail by completing Beyond's customizable profile forms. The forms cull only the databases or topics users request, eliminating the need for users to scan all Notes databases or mail.

"With the mail filtering provided in this product, why keep Notes Mail?" Lee said. "Customers can use this as an alternative mail user interface."

Lotus plans to integrate cc:Mail with Notes but has not done so yet. When it does integrate the two, analysts say Beyond could lose its current window of opportunity.

"Beyond may go beyond the capabilities of cc:Mail now, but the question is how much functionality will be built into Notes 3.0, which will be released at the end of the year," said Matt Cain, an analyst with The Meta Group, in Westport, Conn.

Cain and others said Notes 3.0 will bundle many of the E-mail features Beyond is counting on to lure cc:Mail users.

But Lee countered that BeyondMail for Lotus Notes contains richer functionality than what will result from Notes and cc:Mail integration. BeyondMail for Lotus Notes contains BeyondMail for Windows and a collection of forms and rule technologies optimized for Notes, called the Notes Connection Pack. The pack is available free to licensed BeyondMail customers, but each Notes user must purchase a BeyondMail license.

The Novell MHS and Banyan Vines editions of BeyondMail are priced at $995 for a 10-user license and $1,995 for a 20-user license. The Remote Access edition is available for $295.

IBM dives into management field with focus

By Torsten Busse

IBM last week announced its first OS/2-based LAN management platform, which analysts say is open and powerful enough to make the company a major player in the profitable management market.

LANfocus Management/2 provides a set of applications for monitoring network performance, configuration management, and systems use. It is also designed to let LAN managers write custom applications for all LAN resources.

"It is an open architecture based on standards, which provides the best of three worlds for management of distributed systems," said Frank Dzubeck, president of Communications Networks Architects Inc., in Washington.

These "three worlds" are LANfocus, which addresses LAN and PC systems management; NetView/6000, for management of AIX networks; and NetView, for mainframe management, he added.

Industry observers said the platform and its related components will provide what is needed to handle distributed enterprise network management.

"IBM offers a nice gateway into NetView, which makes it very strategic," said Jeff Erwin, vice president of engineering at ProTools Inc., one of the 14 vendors who announced support for the LANfocus platform.

"An awful lot of Fortune 500 companies are using NetView as their central management platform, and the more integration they get with the LAN environment, the better," Erwin said.

The management offerings also demonstrate that IBM is looking ahead to a less mainframe-centric world, company officials conceded.

"Network management is a rapidly growing market and there are definite business opportunities here," said Bill Warner, IBM networking systems director, enterprise management.

LANfocus Management/2 is based on OS/2 2.0 and supports the Common Management Information Protocol and the Simple Network Management Protocol.

IBM has licensed Novell Inc.'s NetWare Services Manager for OS/2 for integration into the platform, which enables it to manage NetWare servers.

The LANfocus APIs are based on the X/Open Management Protocol and the Open Software Foundation's X/Open interface.

LANfocus will include IBM's Configuration, Installation, and Distribution (CID) process, which transfers software from a LAN server or host to workstations without user involvement.

More than 150 software vendors have committed to enabling their products for remote CID distribution.

IBM's LANfocus Management platform products

Product	Price	Availability
LANfocus Manage/2 1.0	$1,245	2nd quarter 1993
LANfocus View/2 1.0	$595	2nd quarter 1993
LANfocus Enable/2 1.0	$55	2nd quarter 1993
LANfocus Agents/2 1.0	$55	2nd quarter 1993
LANfocus Agents Extended/2 1.0	$75	2nd quarter 1993
LANfocus Start/2 1.0	$595	11/20/92
IBM Network Transport Services 1.0	$85	11/20/92
NetView Distribution Manager for MVS 4.0	$2,175-$3,945	12/28/92
NetView Distribution Manager/2 2.0	$1,495 server $95 per client	12/28/92
IBM Software Profile Management Facility (MVS/ESA) 1.0	$17,500	12/11/92

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Central Point to unveil NetWare-based antivirus strategy

BY STUART J. JOHNSTON

Central Point Software will announce this week at NetWorld a comprehensive strategy for virus interception, monitoring, and control over networks.

The plan — called Central Virus Management — centers around the company's antivirus package, which will be available next month for Novell NetWare, Windows, DOS, and the Macintosh, said Srivats Sampath, director of product marketing for Central Point's network and security products.

Although some of the antivirus products have been available previously, such as the DOS and Windows versions, the new strategy ties them together over networks via a messaging system and a management-notification scheme.

Key to the system is the concept that any PC on the network can be a point of entry for viruses and that it is necessary to provide a cohesive approach to detecting, eradicating, and tracking virus incursions.

The core of the system is a NetWare Loadable Module (NLM) designed to provide integrated virus protection for the PC enterprise, including protection for servers and desktops, as well as centralized administration and reporting. Anti-Virus for NetWare costs $1,199 and includes a five-user license for Anti-Virus for DOS and the Macintosh, with additional client licenses available.

Central Point Anti-Virus for DOS, Version 1.4 costs $129 and can detect and eliminate more than 1,300 PC viruses. Upgrades cost $25, and a subscription plan for four consecutive releases costs $79.95. Anti-Virus for the Mac costs $69.95 and provides capabilities identical to those found in MacTools 2.0.

The company has also released its free Scan-Only System for DOS users through Central Point's bulletin board system at (503) 690-6650 and CompuServe.

The Beaverton, Ore.-based company also introduced a range of technical support options, ranging from a pay-per-call offering and unlimited call service to on-site, quick-response teams.

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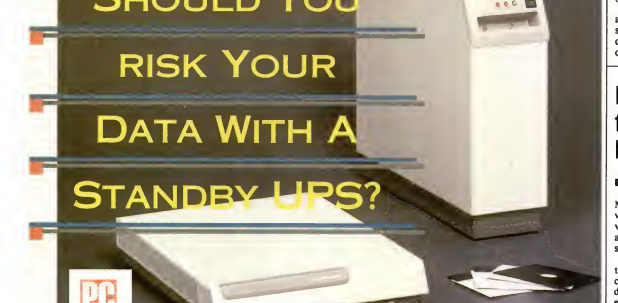

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Device driver kit for Win32 to ship by month end

BY STUART J. JOHNSTON

Microsoft will deliver by month end early versions of the Win32 Preliminary Device Driver Kit (DDK) for Windows NT and give a sampling of the NT operating system at a developers' conference.

Beta versions of the DDK will be free to those who pay the $845 to attend the conference, with a $50 price break for developers who attended the NT developers' conference in July, said Bob Taniguchi, Microsoft's manager of hardware vendor relations.

Developers who cannot attend the October 26 conference in Anaheim, Calif., can still buy the DDK, Taniguchi said. Pricing is identical to the Win32 Preliminary Software Developer's Kit (SDK) for Windows NT, which costs $69 on CD ROM without printed documentation or $399 including the books.

Developers also need the SDK to write device drivers, Taniguchi said. Microsoft took advantage of lessons it learned about the difficulty of writing OS/2 device drivers and has endeavored to make it simpler under NT, he said.

Still, writing hardware device drivers for any operating system is not a simple task. It often involves debugging code failures inside the system kernel.

NT developers can now use the same tools they use for other work. Microsoft has also implemented the generic "unidriver" concept it pioneered with Windows 3.1 and expanded it to cover devices such as displays and SCSI adapters, cutting the developers' work in handling special features in each device.

Additionally, Windows 3.1 virtual device drivers will work with NT "right out of the box," Taniguchi said.

However, implementing 32-bit drivers will let developers use advanced features such as continuously variable half tones in printers or smart print managers that can send messages notifying users when a printer jams or runs out of paper.

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PIPELINE

ANNOUNCED

AIQ to release upgrade of stock analysis tool

StockExpert from AIQ Inc. helps users track investments and provides technical analysis of stocks. MarketExpert helps users determine short-to-intermediate-term stock market movements. StockExpert 4.0 will be priced at $399 and is scheduled for release October 15. MarketExpert is priced at $199 and set for release November 1. (800) 332-2999.

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Expert Choice 8.0, a decision-support program, organizes complex, problem-related information into a hierarchical model consisting of goals, possible scenarios, criteria, and alternatives. Users can import and export data to and from Lotus 1-2-3 files. Expert Choice Inc. is shipping the single-user version for $495; network and run-time version prices depend on configuration. (412) 682-3844.

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BUNDLES

Maxa, Symantec offer diagnostic products

Maxa Corp. packaged its desktop diagnostic Snooper with Symantec's Norton Utilities for Macintosh, Version 2.0, which tests and diagnoses any Macintosh system. The Snooper Software Only version bundled with Norton Utilities for Macintosh is priced at $229; a version of Snooper for Mac Ils and Quadras bundled with Norton Utilities is $299. The bundles are available through December 31. (818) 543-1300.

• • •

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Continued on page 22

NT's delays mean a second look and respect for OS/2

BY SHAWN WILLETT

IBM's OS/2 operating system will pick up momentum while Microsoft Corp.'s Windows NT is stalled in development, according to analysts' predictions.

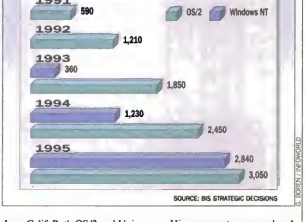
According to several market research firms, OS/2 not only will gain a significant edge in installed base next year, but users tired of waiting for Microsoft may switch to IBM's platform.

"[Microsoft] will definitely lose some people to OS/2," said Jeff Henning, analyst at BIS Strategic Decision Inc., in Norwell, Mass. "Microsoft has been saying for so long that they will ship it this year."

Research analysts are busy recalculating earlier figures that predicted Windows NT would shortly overtake IBM's OS/2 — an operating system some observers had virtually written off not too long ago.

According to Microsoft, the first version of Windows NT will not be available until the first or second quarter of 1993, instead of the fourth quarter of this year as originally announced.

"IBM is going to ship a lot of OS/2s before NT gets to be a real product," said Rikki Kirzner, analyst at Dataquest, in San Jose, Calif. Both OS/2 and Unix are expected to fare better against Windows NT than previously predicted, Kirzner said.



"We are seeing more interest out of the IBM world than we previously forecast," she added.

According to BIS predictions, Windows NT will not overtake OS/2 until 1996. "Many users will sit out the first release [of NT]," Henning said.

His comments were echoed by several analysts and users who predicted the first release will be too rough around the edges for firms to move critical applications over to it.

"NT is not something you will want to put applications on until the latter part of 1993 or early 1994," said Matt Cain, analyst with The Meta Group, in Westport, Conn.

Canvas fills cross-platform graphics needs

BY JEANETTE BORZO

Designers looking for a cross-platform solution to their graphics needs can turn to Deneba System's Canvas. The Macintosh-based graphics program is due to ship for Windows in the first quarter of next year.

Canvas for Windows will offer the same features as its Mac counterpart as well as a few extras, such as support for pressure-sensitive drawing tablets, image editing features, Multiple Document Interface support, and an option to flow text from one column to another.

The new product also will be an Object Linking and Embedding (OLE) client and server.

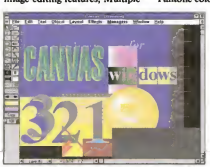
An update to the Mac version of Canvas, offering all the features of the Windows version, is expected by year end.

As in the Mac version, the $399 Canvas for Windows offers presentation capabilities, a large selection of file translators, and Pantone color support.

It also features four-color separations, Bezier drawing, and auto-tracing.

Some graphics users indicated that cross-platform compatibility is an important program feature.

"[Cross-platform compatibility] is terribly important to me," noted Doug Lidster, a CorelDraw user and network administrator at Woodsmith Corp., in Des Moines, Iowa. Lidster often needs to import Mac-based graphics files into his Windows-based programs.



Canvas offers support for image editing features and a multiple document interface.

But others indicated that Canvas for Windows is not a critical product for Deneba's user base.

"Deneba will tell you the majority of their users are technical illustrators," said Joan-Carol Brigham, director of graphics and multimedia research at International Data Corp., in Framingham, Mass.

"But the profile of an engineer is that they have a Mac and a Sun workstation. I just don't see [having a Windows version] as a big factor for them," she said.

According to a source close to Deneba, a $99 to $149 upgrade will be available to users of competing products such as CorelDraw, Micrografx Designer, and Gold Disk's Professional Draw.

Based in Miami, Deneba can be reached at (305) 596-5644.

Pillar budget system does forecasting

BY ED SCANNELL

Windows-based users can pull together annual budgets and rolling forecasts and do high-level business modeling with an enterprisewide budgeting system from Pillar Corp.

Based on a distributed architecture, FYPlan allows users to work transparently across various networking environments.

The program is centered around the company's Open Framework technology, which makes it possible to develop hardware-independent applications and extend FYPlan to new platforms while maintaining common code.

"With the acceptance of Windows 3.1 and the availability of object-oriented development tools, Windows now allows us to offer more comprehensive budgeting to the large PC market," said Ken Ross, president of Pillar.

Pillar is already shipping a version for the Macintosh. With the Windows version, expected in December, users involved in budgeting and forecasting applications can now more easily exchange information.

A built-in database allows users to produce customized reports and graphs by searching and sorting through planning data. For example, sales forecasts can be sorted and subtotaled by salesperson, product, or distribution channel.

Information from several systems, such as general ledgers, accounting systems, databases, and spreadsheets, can be integrated into a single document.

With FYPlan managers can develop a "bottoms-up" budget because the product automates the consolidation process and supplies audit trails that show what information has been changed.

Some of the hardware platforms supported include Digital Equipment Corp.'s VAX series, Hewlett-Packard Co.'s 3000 line, and IBM's AS/400 midrange systems.

The new product also works with standard networking topologies such as Ethernet and Token Ring, as well as major network operating systems such as NetWare, OS/2 LAN Manager, and TCP/IP.

Available by year end, FYPlan costs $19,500 for a five-user version. Additional users can be added for $500 each.

Pillar, in Foster City, Calif., can be reached at (415) 349-6200.

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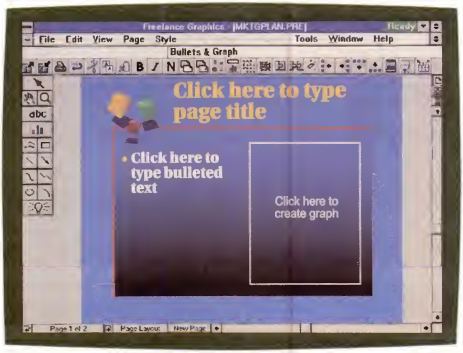

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What's more, a recent study conducted by the Usability Sciences Corporation foun that people trying Freelance Graphics for

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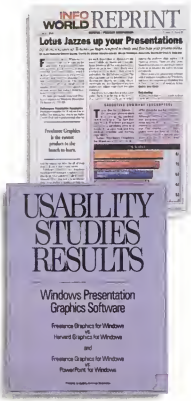
Or better evidence to prove it.



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ClearAccess for Windows adds support for DB-Library

By Scott Mace

ClearAccess for Windows, a data query tool that migrated from the Macintosh last spring, now connects to SQL Server's DB-Library API and Data Access Language servers.

Like its predecessor, ClearAccess for Windows 1.1 also accesses Oracle databases via SQL Net. Data Access Language lets ClearAccess connect to DB2, Ingres, Informix, and other mainframe and mini-based database servers.

ClearAccess 1.1 also lets users drag and drop tables and columns on an information icon, which queries the database and returns comments, remarks, and other information about the item.

An improved Microsoft Excel add-in and macro adds menu items to Excel that give users the ability to access any data that ClearAccess can access. A similar macro for Informix Wingz is also provided.

ClearBase lets users create prototype applications without the need to access a remote SQL database. Any application running in Windows using Dynamic Data Exchange can use ClearAccess Scripts and ClearLinks to retrieve and send information to a ClearAccess-supported database.

ClearAccess for Windows 1.1 is available now for $460; volume discounts are available.

ClearAccess Corp., based in Fairfield, Iowa, can be reached at (800) 522-4252.

AutoImport removes the language barrier

Makes selecting and arranging mainframe data easy for end-users

By Jim Hammett

The newest upgrade to Spalding Software Inc.'s AutoImport lets users select only the data they want translated off the mainframe and use it instantly in their PC software applications.

"AutoImport lets the users bring any data down from the mainframe, whether it is columns of data or data within a column, and convert it," said Rick Wilson, telecommunications MIS director for Viking Enterprises, a graphic arts firm in Chicago. "Then that data can be placed in PC-based spreadsheets or in word processing documents, or imported to a PC database."

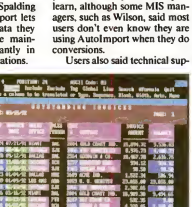
AutoImport can handle unwanted control characters, commas, percent signs, dates, and other symbols.

The new version also allows users to include formulas when translating a report into a spreadsheet.

According to Spalding president Richard Hays, AutoImport 2.1 allows users to be self-sufficient. "The user can transpose rows and columns; they can do a search and replace, and do it by numeric values or dates or labels."

Users said the PC-based application is simple and easy to learn, although some MIS managers, such as Wilson, said most users don't even know they are using AutoImport when they do conversions.

Users also said technical support from the company has been very good.



AutoImport users can point and click at columns to capture only the data needed.

"It's not talking with a bureaucracy but with real people. When we needed help we got it right away," Wilson said.

The $189 single-user package — an available LAN version is priced based on configuration — supports Lotus 1-2-3, Microsoft's Excel, Borland's Quattro Pro and dBase, and other file formats.

AutoImport requires an IBM PC or compatible, DOS 2.1 or later, and 400K of RAM.

Spalding Software, in Norcross, Ga., can be reached at (404) 449-1634.

Vendors not ready for WFW

Few Windows for Workgroups apps will ship this year

By Shawn Willett

Microsoft plans a major marketing push involving third parties for the release of Windows for Workgroups (WFW) later this month, but a quick check of independent software vendors shows that few products will be ready to run on the platform this year.

Third-party support will be crucial to the success of WFW, according to Microsoft officials and observers. The product will be formally introduced in New York on October 27.

In addition to demonstrating third-party products in New York, Microsoft plans a major effort at fall Comdex in November. An extensive ad campaign will accompany the product launch in an effort to educate users on the product.

"This is as fundamentally important to us as the release of Windows 3.1," said Daniel Petre, vice president of the workgroup division. "We expect from 30 to 40 percent of Windows 3.1 users to move over to Windows for Workgroups within the year."

Microsoft expects WFW to significantly outsell Lotus Notes, the biggest selling workgroup application on the market today. "We will ship 10 times what they are shipping," Petre predicted.

He acknowledged, however, that to compete with Lotus Notes, Microsoft must emphasize that users can incorporate their non-Microsoft software into a workgroup scheme.

Companies such as Beyond Inc., Jetform Corp., Symantec's Norton Desktop division, and LaserData will show products specifically designed for WFW.

Microsoft's Daniel Petre: The rollout of WFW is as important as Windows 3.1's release.

Others plan to include hooks into Microsoft's Messaging Application Programming Interface and Dynamic Data Exchange interfaces and tout their products as messaging-enabled.

However, most products will just incorporate simple messaging features, and almost none will ship before next year. "This is not going to hit the ground running," said Ann Palermo, analyst at International Data Corp., in Framingham, Mass.

It will be up to users and third-party developers to come up with the kind of sophisticated workgroup applications that Microsoft recently demonstrated at a briefing in Bellevue, Wash., said Microsoft officials. And that may take time.

Petre says the confusing picture will clear up as users see the products in action. He also says a sizable portion of users will want WFW — which will retail for $249 for Windows 3.1 users — just for the mail-enabled applications and will not care if sophisticated workgroup software isn't ready yet.

"A large portion of Lotus Notes users are just using it for mail," he said. "We expect [WFW] to have value to users from Day 1."

C-scape brings GUI look to applications

By Kelley Damore

Developers will be able to give text-based applications a GUI look and feel with an upgrade of Liant Software Corp.'s C-scape User Interface Management System.

With C-scape, Version 4.0, users can create applications incorporating such features as style borders for text and graphics mode, scroll bars, and minimize and maximize buttons.

This object-oriented tool also adds a variety of predefined classes of code.

These include a windows class that displays very large data files quickly, a class to create highly customized windows by attaching user-defined functionality, and a class that lets customers display images from PCX files.

Other capabilities include new date and time functions, a feature that lets users set up colors that are consistent across different displays and operating systems, and a new mouse handler. The program also offers the Oakland Graphics Library, a device-independent library that enables users to create simple images such as charts and graphs.

The program supports Microsoft C/C++ 7.0 and Watcom C 9.0, in addition to Borland C/C++ 3.x and Zortech C++ compilers.

C-scape 4.0 for DOS is available immediately. Versions of C-scape for Extended DOS, VMS, and Unix are scheduled for release in the fourth quarter of 1992, company officials said.

C-scape DOS is priced at $499, C-scape 386 is $999, C-scape Unix is $1,499, and C-scape VMS is $2,499. Users of Version 3.1 or later can upgrade for $149.

Liant, in Framingham, Mass., can be reached at (508) 872-8700.

Lucid offers suite of DOS palmtop applications

A suite of programs from Lucid Corp. will give buyers of DOS-based palmtop computers the option of having built-in applications.

The Frontier suite, announced at Lap & Palmtop '92 in Chicago, includes a spreadsheet, word processor with outliner, database, communications, appointment scheduler, address book, financial calculator, and file manager. They have been optimized for palmtops' screens, keyboards, and memory limitations.

The company has built other portable applications on the Sharp Wizard, Casio BOSS, HP 95LX, and Tandy Model 100. "We've been developing for small computers since the [Tandy] Model 100 in 1983," said David Hayden, a company representative.

The Frontier suite will appear first on DOS-based palmtops, but the company plans versions for Windows for Pen Computing, OS/2, Newton, Macintosh, and Unix.

Company officials would not name hardware vendors but said the suite should appear on palmtops in the first quarter.

— Yvonne Lee

Why do 9 of the top 10 PC manufacturers preinstall Microsoft Windows on their PCs?

This One
SDS8-QPC-KJ90

PIPELINE from page 17

ANNOUNCED

WordPerfect ships electronic forms tool

WordPerfect Corp. expects to ship by year end InForms 1.0, a forms package that will be available and sold as two separate components: Designer and Filler. The application will focus on electronic distribution of forms and printed output, WordPerfect said. (800) 451-5151.

• • •

IDX Technologies expects to introduce this month Computer Owner Protection (COP) software and International Computer Recovery Center (ICRC). COP is an identification code-bearing application that makes computers identifiable and that can be installed by either the owner or manufacturer into computers including desktops, laptops, and notebooks. ICRC is a centralized, computerized data bank of current ownership information for all registrants with products containing COP. COP will be available for $49. For other security features, such as virus protection and access control, the total package price is $89. (800) 645-5404.

SHIPPING

GUI builder reduces programming time

Programmers can cut as much as 70 percent of their effort in creating OSF/Motif-based graphical user interfaces for applications on Unix workstations with iXBuild 2.0 from iXOS Software GmbH, now available to the U.S. market. It is priced at $4,500 for the first user license, with volume discounts available. UniPress Software Inc. can be reached at (800) 222-0550.

• • •

BUNDLES

Aldus will bundle publishing packs

Aldus Corp. is offering PageMaker, FreeHand, and PhotoStyler for Windows users in a bundle through the end of the year under the title of Aldus Publishing Showcase. The bundle costs $995, less than half the combined price of the three products. (206) 628-2320.

ALLIANCES

Adobe, SGI sign pact on Photoshop

Silicon Graphics Inc. and Adobe Systems Inc. recently announced an agreement to support Adobe Photoshop for SGI's Iris Indigo workstation. The bundle will ship in 1993 and will be the first Unix implementation of Photoshop.

Abraxas accounting program praised

Users like simplicity of its inventory, receivables, sales order features

By Jim Hammett

Abraxas users are saying the management and accounting application is helping them organize and track inventory, receivables, and sales orders quickly and easily.

"We've tried just about every accounting program out there in this price range, but none came close to offering the management features found in Abraxas," said Tim Bodkin, manager of Floor Images International in Cape Coral, Fla. "Anything comparable would probably cost $10,000 or $15,000," he added.

Priced at $695 for a single user and $995 for multiple users, the application provides dedicated files for historical balance sheets, checkbooks, inventory items, clients, vendors, and employees. It automatically updates all files so that users have access at any time to the most up-to-date account information within the company.

"For us it is a powerful management program that not only maintains historical data for our business but also allows us to make sales orders, invoices, packing slips, and mailing labels in a single keystroke," said Ben Longo, owner of Score Right Publishing Co., in Orange, Calif.

Users also said they liked the package's easy-to-learn and easy-to-use features, such as account abbreviations instead of numeric account codes.

"We used to have one person who took orders, but now anyone in the company can take an order and enter the data into Abraxas without having to know accounting procedures or codes," Longo added.

Abraxas also automatically generates supporting schedules for balance sheet and income statement, automatic tax and trust accruals, and automatic depreciation.

Users can bar-code inventory and access all accounts with the same due date or ship date. Abraxas includes analysis features such as sales analysis by category, by client, by employee, by account, or by period to year.

Aptech is located in Binghamton, N.Y., and can be reached at (800) 443-3732.

Product Spotlight

Clarify apps automate support

Users can get automated service and support help with a range of products from Clarify Inc. The offerings include ClearSupport, a technical support management system; ClearQuality, a defect tracking system; and ClearLogistics, a field service and inventory management system for companies with sophisticated products and a broad base of customers.

The modular applications share a common database and interact with other business systems. The products support relational databases and run on Microsoft Windows, Macintosh, and Motif graphical user interfaces. ClearSupport averages $5,000 per concurrent user, and ClearQuality averages $4,000 per concurrent user. Both are available now. ClearLogistics will not be available until the first quarter of 1993.

Clarify is located in San Jose, Calif., and can be reached at (408) 428-2000.

CA buys Glockenspiel, gaining C++, libraries

Libraries will show up in CA's Aspen

By Scott Mace

Computer Associates has acquired Glockenspiel Ltd., of Dublin, Ireland, for its C++ compiler and CommonView class libraries. The libraries will be embedded in CA's Aspen, the forthcoming Windows-based compiler for CA-Clipper, CA-dBFast, and other XBase languages.

Other CA language products will utilize CommonView classes as they migrate to object-oriented methodologies, said Marc Sokol, CA director of product strategy.

CA will market Glockenspiel C++ and CommonView as separate products. Glockenspiel C++ runs on DOS, OS/2, Unix, and VMS, and applications developed on one platform are portable to the others. CommonView works with other popular C++ compilers, including those from Microsoft and Borland, CA officials said.

Some XBase developers are skeptical that Glockenspiel C++ or CommonView can gain a foothold in the XBase market.

"Glockenspiel knows multiplatform development like no one else does," says Vadim Yanovsky, president of Clear Software Inc. of Brookline, Mass. "We're going to stay with Borland or Microsoft, because [they're] standard."

Sokol says that C++ and its tools are only now "at the very beginning of a steep ramp of acceptance. Borland and Symantec and Microsoft don't have the kind of experience selling into multiplatform environments that we do."

Earlier this year, CA said it would demonstrate Aspen at Comdex in November and release beta versions to sites this year. John Carolan, managing director of Glockenspiel, says Aspen programs are already using CommonView in the development lab.

Glockenspiel is a privately held company which CA bought for an undisclosed sum.

CoHort's CoVis animates large, dynamic data sets

By Jeanette Borzo

Scientists and engineers looking for a way to visualize large data sets have an option in CoHort Software's CoVis program.

From the same company that makes CoPlot, CoStat, and CoDraw, CoVis is a DOS-based program for displaying animated views of data for researchers working with mathematical models, data acquisition boards, chaotic systems, and other sources of large and/or dynamic data sets.

The software can create nine different graph types including Nchannel, two- and three-dimensional snake, vector, wire frame, points, and two-dimensional and three-dimensional programmable graphs.

Users can spin all 3-D graphs interactively in the menu-driven program and have the option of displaying a static drawing behind a graph.

Routine functions can be automated with the program's macro capabilities, and data can be imported in any ASCII, dBase, Excel, Lotus 1-2-3, and Quattro file.

Graphs can be output in a number of graphic file formats, and the program supports a variety of plotters and printers.

Also, menus appear beside a graph so users can specify which part of the graph they wish to modify and how they want to modify it.

Changes to the graph are shown immediately.

Due to ship next month for $395, CoVis comes with free technical support.

The program requires an IBM PC or compatible with DOS 2.0 or later, 640K of memory and 1½ megabytes of disk space.

CoHort Software, headquartered in Berkeley, Calif., can be reached at (510) 524-9878.

Why are over 1 million copies of Microsoft Windows sold every month?

IBM signs with firm to sublicense PenDOS operating system

By Yvonne Lee

In response to customers' demands for a desktop-compatible pen operating system, IBM signed an agreement with Communication Intelligence Corp. to exclusively resell and sublicense PenDOS.

The agreement allows IBM to license and sell the operating system to other hardware vendors, as well as to use it on its own hardware. It does not affect licensing agreements that CIC previously signed with other hardware vendors.

The agreement does not negate or change IBM's agreement to license Go Corp.'s PenPoint when it ships the ThinkPad, said Gordon Arbeitman, senior programmer for pen systems.

"We are going to have a three-operating-system approach involving PenDOS, PenPoint, and OS/2 for Pens," Arbeitman said. "We've come to the conclusion that there's a great need for an operating system that runs existing applications on minimal hardware."

Even more important than being able to run existing applications on pen computers is the capability to communicate with corporate data and use DOS-based tools, analysts said.

"Right now, it's somewhat of a custom market," said Bill Ablondi, vice president of BIS Strategic Decisions, in Norwell, Mass.

"You're building applications with very specific [functions] in mind. Many of these are field applications currently using hand-helds. These portable terminal applications become candidates to re-engineer [under PenDOS]," he said.

"The application development tools for Windows and DOS are more advanced, even though they are not pen-centric," said Richard Shaffer, editor and publisher of *Computer Letter*, in New York.

Nevertheless, analysts say the interest in desktop-compatible operating systems does not spell the death of PenPoint.

"I can't say that it's a death blow to Go, it's really just [IBM] covering their bases," said BIS' Ablondi.

Schaffer said PenDOOS might be particularly useful to adapt DOS-based graphics programs, such as AutoCAD. "That doesn't mean it's displacing PenPoint, because PenPoint's not even a contender in those markets."

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Express Publisher adds on-line advice on layout, fonts

By Jeanette Borzo

Corporate desktop publishers looking for advice on the design of flyers, newsletters, and brochures can turn to Power Up Software Corp.'s new Express Publisher 3.0 for DOS.

Due to ship by month end, the new version of the low-end desktop publisher offers a layout adviser from Roger Parker, author of *Looking Good in Print*. The adviser offers on-line advice and templates to guide users through the design process, automating basic functions such as setting up a grid system and selecting matching typefaces.

"[The layout advisor] will show you some options on the screen so you can put something together pretty quickly," said beta tester John McIntyre, personnel manager at Northwest Manufacturing Inc., in Redmond, Wash.

Also new to the program are automatic layout tools, enhanced print and screen performance, options to manipulate text, new page templates, and a story editor with a Search and Replace feature.

"Using the story editor speeds things up," McIntyre said. "In the past you were limited pretty much to importing text from a word processor."

"The way the fonts display is nice," said Paul Kittle, campus network administrator at Loma Linda University, in Loma Linda, Calif. "Now when you choose a font, you get to see what the letters will look like before you use them."

Current users of Express Publisher can upgrade to the $149.95 software for $39.95. Users of competing desktop publishing programs can upgrade for $59.95.

Power Up Software, in San Mateo, Calif., can be reached at (415) 345-5900.

Why are 95% of the people who use Microsoft Windows happy?*

Window Manager / Brian Livingston

Inexpensive utilities may be your best buy in Windows tools

In the past two weeks I've written about System Engineer and the Windows Resource Kit On-Line from the Windows User Group Network. You should also check out a utility from Sloop Software called More Control, which duplicates some of System Engineer's customization powers.

More Control doesn't try to handle every WIN.INI and SYSTEM.INI setting, as System Engineer does. It only addresses the ones you might want typical users to change. Buttons in More Control's dialog box allow users to select a different Shell and Task List, put items on the Load=, Run=, or Programs= lines, or add associations — all without opening INI files in a text editor. It also offers convenient pop-up windows to configure Help colors, icon title fonts, and enhanced-mode settings such as Exclusive DOS sessions.

Interestingly, More Control is not an EXE file. It's a Windows 3.1 Control Panel module. Place it (and its supporting DLL and HLP files) into your Windows directory. It magically appears in Control Panel the next time you start Windows.

More Control is a free, copyrighted utility. That means you can give it freely to every user in your company but not sell it or bundle it with products for sale. All its authors ask is that you also evaluate their shareware program, Sloop Manager, or its commercial version, CEO. Both these programs completely replace Program Manager. They offer groups within groups, passwords for groups, a command toolbar, and many other improvements.

You can download MORECN.ZIP and SLPMAN.ZIP from CompuServe (Windav, Library 11 and 1) or America On-Line. Or you can send $36.50 for Sloop Manager, $69.95 for CEO (plus 6 percent tax for Colorado residents), to Sloop Software, 6457 Meseedge Lane, Colorado Springs, CO 80919. For credit card orders, call (800) 847-0309. Thanks to reader Tim Murad for his input on these apps.

Another utility, Exclaim from Terratech Inc., almost completely eliminates the need for a DOS session in Windows. Exclaim is one of the most ambitious shareware programs (for its size) I've seen. It emulates all the major DOS internal commands (Dir, Copy, etc.) in a graphical window that you can resize, scroll, and use like any other window. Yet Exclaim uses only 76K of memory.

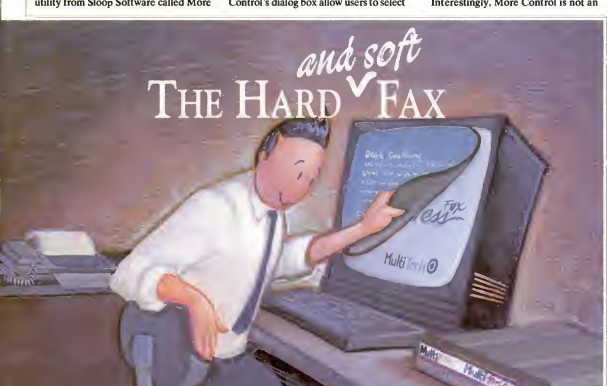
This means that you can put Exclaim on the Load= line of your WIN.INI file, or in the StartUp group of Windows 3.1, and have a DOS prompt handy whenever you need one. Or you can click File Run in Program Manager and simply type "!" — because Exclaim is really a Windows program named !.EXE, and because it is a genuine Windows application, you can feed "!" keystrokes from a Recorder macro, unlike DOS sessions.

Exclaim does not support Set, Format, and other DOS commands. And when you start a batch file from Exclaim, it starts running in a separate DOS window. (You can override this, though.)

Although Exclaim does not support every possible DOS command and feature, it offers many commands that are not available in DOS. You can move files to a different location, change the color of your command line window without strange escape sequences, and write "if then endif" statements. Funny that a single programmer, working at home, can provide these features when Microsoft hasn't been able to put them into DOS for more than a decade. You can even start Windows applications from the Exclaim command line. Type "notepad," for example, and Notepad appears in its own window.

Order Exclaim by sending $20 to Terratech, 19817 61st Ave. S.E., Snohomish, WA 98290. The company isn't yet taking phone or credit card orders, but I think you'll find Exclaim is worth cutting a check.

Brian Livingston is the author of Windows 3.1 Secrets *(IDG Books). Send tips to: CompuServe 70053,2035; MCI 420-0583; Internet 420-0583@mcimail.com; or fax: (206) 282-1248.*



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Hard Facts

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- Our new MultiExpressFAX software is designed for simplicity and performance, with ...
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Carnival Cruise Lines chose Remote LAN Node™ to connect their Miami-based LAN to their remote offices – ships at sea – for a simple reason: In their words, remote users "all get transparent access, just as though they were here at corporate."

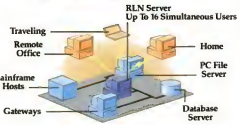
In fact, the comment we hear over and over again is, "It's just like being there." Because RLN™ lets you extend your network in such a transparent way that users have the freedom to work anywhere, without losing network functionality.

THIS IS A SIMPLE ILLUSTRATION OF HOW REMOTE LAN NODE WORKS.

RLN is a unique, economical software solution that *BYTE Magazine* said "comes closest to running an Ethernet cable directly from site to site." (In a way, you can think of it as a software implementation of a network interface card.) And, as *BYTE* continued, it "eliminates the performance bottlenecks of remote-control packages and the protocol dependence of LAN-aware modems."

That's why companies like Carnival are using RLN to connect to remote clients across the world – or across the street.

THIS IS A SLIGHTLY MORE COMPLEX ONE.



RLN lets up to 16 remote PC users dial into your LAN at once and become actual nodes on your Ethernet network. Because RLN is built on industry-standard, MAC-level APIs, you can access any network protocol, such as IPX/SPX, TCP/IP, SPP/IPC, OSI and NetBEUI – or any interconnected combination. That means RLN is compatible with virtually any network operating system. So it not only gives you freedom. It also gives you independence.

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LAN Times wrote, "Installing RLN on your LAN is one of the better ways to experience the future today." And while we heartily agree, we'd like you to share the experience even before you install RLN on your own network.

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NEWS / HARDWARE

PIPELINE

PRICE CUTS

Toshiba cuts portable prices once again

Toshiba America Information Systems Inc. cut the price of its T1850C Satellite color notebook by an unspecified amount before it even began shipping the systems. Toshiba expects the color system, previously list priced at $3,299, to actually sell for between $2,250 and $2,500 depending upon configuration, representing a reduction in price of about $650, Toshiba executives said. The portable is now shipping. (800) 334-3445.

• • •

Xante Corp. reduced the prices of its 8-page-per-minute (ppm) and 4-ppm laser printers by 11 percent to 18 percent. The Accel-a-Writer 4000 with 8 megabytes of RAM now lists for $2,495, a reduction of $300. The Accel-a-Writer 8000 with 8 megabytes of RAM now lists for $3,295, a reduction of $700. (205) 476-8189.

• • •

Another price cut from **Aox Inc.** has lowered the suggested cost of its MicroMaster 25-MHz 486SX and 33-MHz 486DX boards to $1,227 and $1,879, respectively. The boards are processor upgrades for Micro Channel-based IBM PS/2 systems. (617) 890-4402.

LAWSUITS

CTI, MediaVision reach settlement

Creative Technology Inc. and MediaVision have settled their legal disputes out of court, with the result that Creative Technology will license its SoundBlaster Technology to MediaVision. Both companies sued each other over copyright infringement and restraint of trade issues. Other details of the settlement were not disclosed.

ANNOUNCED

TI confirms delay of 50-MHz SuperSparc

Texas Instruments last week said that versions of its SuperSparc chip operating above 40 MHz will be delayed until the first quarter of next year. Originally, a 50-MHz SuperSparc was scheduled to ship sometime this quarter. TI said the delay was caused by not being able to fill current orders and get faster chips out at the same time — so they chose to fill current orders first, a TI representative said.

IBM ThinkPads hit the market

'Pad' does not mean pen for IBM

BY YVONNE LEE

IBM Personal Computer Co. launched last week its new portable line, tagging them with a name the company hopes will provide brand recognition.

"We're hoping the ThinkPad is a much more merchandizable name [than the previous practice of numbering personal computers]," said Scott Bower, director of mobile computing brands.

The ThinkPad line, originally the moniker for IBM's pen-based tablet, includes two 486-based notebooks, a 386 notebook, and the original tablet.

The move could be confusing, however.

"It would be really bad if they were going to keep pure keyboard notebooks in the line, because pad means pen," said Portia Isaacson, president of DreamIt in Colorado Springs, Colo.

Topping the ThinkPad line is a 486-based active matrix color model with the largest screen available on a notebook. The $4,350 ThinkPad 700C uses IBM's 25-MHz 486SLC microprocessor, which is upgradable to 50 MHz.

The 10.4-inch screen displays 256 colors. The 7.6-pound computer ships standard with a removable 120-megabyte hard drive, and its nickel-hydride battery has an estimated life of 2 to 4 hours.

A similar monochrome version — the ThinkPad 700 — uses the same upgradable 486SLC processor.

The ThinkPad 700 is lighter at 6½ pounds and offers better battery life, estimated at 3.8 to 7½ hours, according to the company. Its monochrome VGA screen measures 9½ inches. The system is priced from $2,750 to $2,950 and comes with either an 80- or a 120-megabyte hard drive.

The 700 and 700C systems ship with 4 megabytes of RAM and a math coprocessor socket. They fit into the $895 model 3550 Expansion Unit docking station, which has two card slots and a SCSI device bay.

IBM's ThinkPad 700C has a 10.4-inch, active matrix display and a 120-megabyte hard drive and is aggressively priced at $4,350.

The two computers use a pointing device developed by IBM. The TrackPoint II lets users select objects and navigate on the screen without taking their hands off the keyboard.

These computers have a three-year warranty.

The original ThinkPad tablet is now shipping under the name ThinkPad 700T. A version with 4 megabytes of RAM is priced at $4,795, and another version with 8 megabytes is $5,395.

Completing the ThinkPad line is the 386SX-based model 300, a low-end notebook with built-in Ethernet connectors. An 80-megabyte hard drive version costs $2,375, and one with a 120-megabyte drive is priced at $2,575.

Dell mail-order catalog offers 650 products

BY TOM QUINLAN

Dell Computer Corp. is expanding its software business by offering its mail-order customers 650 applications and peripherals through its DellWare catalog.

The systems manufacturer has long offered users approximately 100 software titles that could be preloaded and tested with its line of computers, said Rob Howe, vice president and general manager of Dell direct sales. "But this is a whole new effort for us," Howe said. "We've learned a lot about how to make this work and we hope to make some money off of it."

Dell's efforts will rely greatly on its relationship with distributor Merisel Inc., which will stock and ship the software and peripherals that will be sold through Dell's catalog.

"We're still required to get authorization from all of the companies whose products we'll offer," Howe said. "And we will still seek out special arrangements and pricing from vendors that will only be offered through the Dell catalog."

Dell is expanding its sales of third-party products through its DellWare catalog.

Dell is already offering products from software developers, such as Microsoft, Novell, WordPerfect, and Adobe, and peripherals manufacturers, such as Epson, Howe said.

The initial catalog will be sent out to Dell's existing 750,000-member customer base in the United States.

Dell will also offer users the option of having any software purchased from the DellWare catalog preloaded onto a Dell computer.

Dell, in Austin, Texas, can be reached at (800) 289-3355.

Two HP printers have an alignment problem

BY TORSTEN BUSSE

The color cartridge for Hewlett-Packard Co.'s DeskJet and DeskWriter 500C has alignment problems that may hamper the capability to use the printer's color features.

HP last week confirmed the difficulties with the cartridge and said it would change the specifications outlined in the users' guide.

Specifically, when printing in Color/Composit Black mode, all printing is shifted vertically by 0.2 inches.

"This offset is disastrous when you print overlays or spot color on preprinted forms," said DeskJet user Kenneth Grymala, vice president of Owl Creek Industries Inc., in Nokesville, Va. He added that the Deskjet 500C is otherwise a wonderful printer.

The offset problem also restricts the right side landscape margin to 0.7 inches rather than the 0.166 inches, as specified in HP's user guide, Grymala said.

"He is right," said Rex Wickenkamp, an HP representive who pointed out that Grymala is using the DeskJet for a type of printing for which the units are not designed.

"This is an extreme case. The DeskJet is primarily for black printing. It is not a replacement for the PaintJet," Wickenkamp said.

Wickenkamp also added that the margins outlined in the user guide are for black printing only. "We will change that with the next revision of the user guide," Wickenkamp said.

Color printing is similarly offset in portrait mode. Printing starts at 0.3 inches from the top, rather than 0.5 inches, and stops 0.7 inches from the bottom. HP said the print region has to be moved up the page to allow the three colors to fire on the last available dot row before the page is ejected.

Coincidentally, this comes a week after the company announced the DeskJet and DeskWriter 550C models, which will ship in November. The 550C model holds both black and color cartridges simultaneously in one unit.

SOME COMPANIE
WILLING TO PAY FOR A
IT'S THE ONL

Design. Engineering. Testing. Service. Support. When you think about it, these are what make one computer better than the next. Which makes it all the more surprising that companies are cutting back in these areas. And, amazingly, some do little but stick their name on at the end of somebody else's assembly line.

It would be like buying a car, looking under the hood, and discovering that it was built by a company you'd never heard of from a place you'd have trouble finding on the map.

It makes you wonder about the kind of company that would do it. Why they would make the decision to put their name on a product over which they maintain little control. And why they would then sell it to their customers.

Obviously, at some point during some meeting in some boardroom, the mandate came down:

Find a way, any way, to cut costs.

At Compaq, when we set out to build affordable PCs, we took a decidedly different approach.

All three of the new COMPAQ computers—the COMPAQ ProLinea, COMPAQ Contura, and COMPAQ DESKPRO/i—are Compaq designed. Compaq built. Compaq tested. And, perhaps most telling of all, each one is Compaq supported.

Precisely because all three of our new, affordable computers are true COMPAQ products, we back them with the same comprehensive service and support as the rest of our computers.

Other PC companies do things differently, like offering substantially limited service and support for products they apparently have less confidence in. Dell has even gone so far as to withdraw their

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compatibility guarantee for the Dimension Line.

Comparing COMPAQ computers with today's "name brand" clone PCs reveals other important differences as well.

With every computer that we build, you benefit from our reputation for industry-leading performance, reliability and durability.

The others offer you no such assurances. After all, how can they be sure of a product they didn't even build? And if they can't be sure about it, how can you?

So the choice before you isn't simply between different computers. It's between different computer companies. The kind of companies that are willing to sell out their name to sell you a computer. And a company whose name still stands for everything you want in a computer.

For more information, just call 1-800-345-1518 in the U.S., or 1-800-263-5868 in Canada.

While other companies have been forced to cut corners, at Compaq, we've managed to lower our prices without lowering our standards.

Some ideas are better than others. Unlike a lot of today's clones, the new COMPAQ PCs are all designed, engineered and tested by Compaq.

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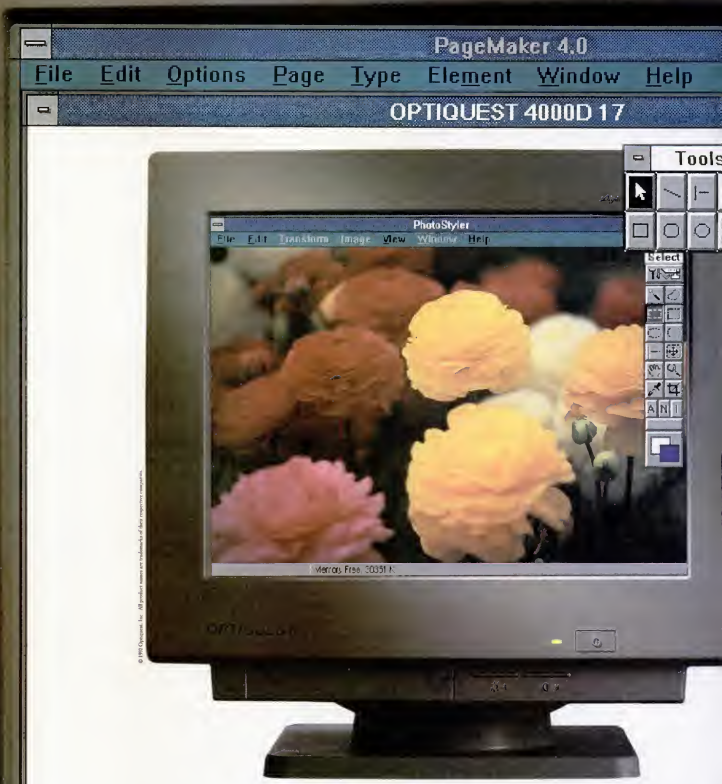

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OPTIQUEST™

OkiSmart printer technology ends jams, smearing

BY TORSTEN BUSSE

Okidata has found a way to eliminate paper jams and smearing by adding an intelligent print head that can sense paper thickness automatically to its dot-matrix printers for the PC.

The company's OkiSmart paper-handling technology eliminates the need for manual adjustment.

"The intelligent print head automatically senses the paper thickness and adjusts the gap between the platen and the print head," said Keith A. Shaw, product manager for Okidata's Microline printers.

"It's especially useful when printing on multipart forms, and it reduces noise since the pins don't always fire at full force," Shaw said.

The new Microline 590 and 591 dot-matrix printers replace the earlier ML390 and ML390 Plus models.

Both printers print at 360 characters per second in draft mode and ship with Windows 3.0 and 3.1 drivers.

Eight bar codes and six fonts are included with the printers.

Also included are four utility programs: the Typer utility, which allows the printers to be used along with a PC keyboard as a typewriter; the Custom Form utility, allowing users to design templates for forms; the Envelope utility for printing envelopes with PostNet bar codes; and the Label utility for printing of bar codes sized to users' specifications on labels and other media.

The Microline ML590 is priced at $699; the wide-carriage ML591 carries a list price of $949.

Okidata, based in Mount Laurel, N.J., can be reached at (609) 235-2600.

Intelligent paper handling, Windows compatibility, and a fast draft printing mode characterize the $699 Microline 590 dot-matrix printer.

JWP president resigns amid financial strife

BY SHAWN WILLETT

The president of reseller JWP Inc. stepped down last week in the wake of the company's mounting financial troubles.

David Sokol, also JWP's chief operating officer, resigned after the company said it would lose $20 million in the current quarter and be forced to renegotiate payments to its creditors, according to JWP representatives.

The firm, which resells PCs and other hardware and provides systems integration services, is now being run by Andrew Dwyer, formerly chairman and chief executive officer.

"The board felt that there was really only room for one person to move the company forward and Andrew was that person," said John McKenna, executive vice president of information services at the Rye Brook, N.Y.-based company.

JWP derived approximately half of last year's $4 billion in revenues from its computer services.

Analysts say the hardware reseller business is a drain on the company because of the price cuts and lower margins in the PC arena.

"With the rapid price decline, we have to ship 30 to 40 percent more units," McKenna said. "It's been difficult to do so because of problems with manufacturers supplying us with products this quarter."

McKenna named to Compaq's and IBM's slow delivery of new computers as the source of part of the company's cash flow problem.

Analysts said that JWP also incurred a debt of approximately $700 million from its acquisitions and other operations, which it is having trouble paying off. "In light of the losses, JWP is discussing waivers of applicable loan covenants with its bank groups," the company said.

Company representatives predicted a smaller loss for the next quarter and said that no more layoffs were anticipated.

In addition to announcing Sokol's resignation, JWP's board of directors said it is auditing its accounting procedures to see if there are any irregularities.

Acer offers two lines of low-priced 486 systems

BY TOM QUINLAN

A revamped series of PCs featuring 486 processors, lower prices, and direct service and support have been introduced by Acer America Co.

The new EISA-based AcerPower and ISA-based Acros systems are designed to meet user demands for more power and performance at a lower price, said Peter Janssen, Acer's vice president of marketing. The systems will prompt Acer to supply direct service and support and customized system designs.

"The market has changed rapidly in the last year, and this is Acer's way of meeting new demands by users," Janssen said.

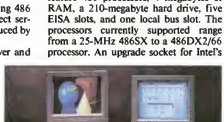
The AcerPower series will be offered in 11 different configurations that feature 486 processors, 4 megabytes of RAM, a 210-megabyte hard drive, five EISA slots, and one local bus slot. The processors currently supported range from a 25-MHz 486SX to a 486DX2/66 processor. An upgrade socket for Intel's forthcoming P5 microprocessor will also be part of the basic system.

Prices will range from $1,599 for a basic 25-MHz 486SX-based system to $3,499 for a 486DX2/66-equipped system bundled with more memory, applications software, and a graphics accelerator board.

Acer's low-cost Acros line will also feature 486 processors exclusively, ranging from a 25-MHz 486SX to a 486DX2/66, and come equipped with 4 megabytes of RAM, a 120-megabyte hard drive, Ultra VGA, and four slots.

Prices will range from $1,249 to $2,149, the company said. Acer will also start offering a one-year, on-site warranty directly to customers, along with telephone support.

Acer, located in San Jose, Calif., can be reached at (408) 432-6200.



Acer is moving all desktop systems in the Power and Acros lines to 486 processors.

TI ships low-cost microSparc chip

In a move to bring the price of a Sparc workstation down to the level of a 486 system, Texas Instruments Inc. announced that it is shipping its low-cost Sparc processor.

The chip, known as the microSparc, offers performance equivalent to the Sparc 2 — Sun's current bread-and-butter technology — at a lower cost.

The company did not announce customers for the chip but said it expects to ship tens of thousands of chips monthly.

Sun will build systems using the chip, said Anant Agrawal, director of VLSI for Sun Microsystems Inc. The chip was developed with help from Sun Microsystems Computer Corp.

TI calls the microSparc a workstation on a chip because it integrates a variety of functions found in separate Sparc chips.

"It's very different from other Sparc chips," said Michael Slater of *Microprocessor Report*, in Sebastopol, Calif. "Before, the goal was to reach a higher performance level. The goal of Tsunami was to provide roughly the same performance of the Sparc 2 but at lower prices."

Slater predicted that the chip will not draw customers away from 486 machines, but instead give customers already considering Sparc workstations a broader variety from which to choose.

In particular, Slater predicted, the microSparc will make Sparc machines affordable for all employees — those in support positions as well as engineers — in sites where Sparcs already exist.

The 50-MHz chips sell for $179 each in quantities of 10,000.

— *Cate Corcoran*

We didn't start the PC price war.

(And it's not like us to join in.)

PC Brand's Color LeaderBook offers speed at a low price

Notebooks feature Cyrix 486SLC processor and a 9-inch VGA passive matrix display

By Yvonne Lee

Color notebook users who want a fast processor without spending a lot of money might look into PC Brand Inc.'s Color LeaderBook.

The $2,595 computer uses Cyrix Corp.'s 25-MHz 486SLC processor and includes a 9-inch VGA passive matrix display. It comes standard with an 80-megabyte hard drive, an internal floppy, and 2 megabytes of RAM — all in a 6.2-pound package.

PC Brand also makes a monochrome version in the same size and weight. It has a 10-inch paper-white VGA LCD that displays 64 shades of gray. The monochrome version, priced at $1,995, ships with a standard 120-megabyte hard drive, internal floppy drive, and 2 megabytes of RAM.

Both models will plug into an optional docking station, which includes two drive bays and three expansion slots. In addition, the two computers come with built-in trackballs.

The computers offer suspend and resume modes to save power by shutting down the disk drive and screen when they are not being used. They have built-in software allowing users to control the Sleep modes.

The 486SLC Color LeaderBook and the 486/SLC Monochrome LeaderBook come with DOS and Windows preinstalled.

The notebooks are scheduled to ship October 15.

PC Brand is based in Moorpark, Calif., and can be reached at (800) 722-7263.

PC Brand's LeaderBook features a passive matrix color screen and a 486SLC processor from Cyrix.

Amdek has introduced seven new monitors ranging from a $199 monochrome display to a high-end system with a resolution of 1,024 by 768 for $799.

Wyse releases seven noninterlaced monitors for Windows applications

Amdek, a Wyse Technology company, has rolled out a line of seven noninterlaced monitors designed for users of Windows-based applications.

On the high end, Amdek is offering three new Super VGA color displays offering resolutions of 1,024 by 768.

The $799 AM/815 is a 15-inch flat-square color display with a 0.28mm dot pitch. Color calibration is also built in. Its resolution is 1,024 by 768 at a 72-hertz refresh rate.

The $699 AM/814, a 14-inch monitor, offers the same specifications as the AM/815 model but offers a 70-hertz refresh rate.

The $649 AM/814LC is a low-price version of the AM/814 offering a refresh rate of 60 hertz.

All three models are available now.

On the low end, the company is offering two new color monitors and one monochrome monitor.

The $599 AM/732E is a 14-inch color monitor with a 0.28mm dot pitch and a resolution of up to 800 by 600.

The AM/732C is a 14-inch color VGA display retailing for $499, while the AM/432N is a 14-inch VGA monochrome display for $199.

The low-end models will be available in November.

All of the monitors have front-panel controls and are PC and Macintosh compatible.

Amdek, based in San Jose, Calif., can be reached at (800) 722-6335.

— Torsten Busse

We didn't start the PC price war.

(Ordinarily, we'd turn the other cheek.)

Elitegroup, Integrix launch their first Sparc 2-compatible systems

By Cate Corcoran

Two companies recently announced Sparc 2 compatibles.

Elitegroup Computer Systems Inc. is shipping what it says is the first Sparc-compatible workstation to use Sun-manufactured motherboards and graphics accelerators.

The company also buys peripherals from the same vendors that Sun uses, according to Elitegroup.

The VS-2000 Sparc 2 workstation is aimed at customers who distrust the quality of clones but don't want to pay the premium prices charged by Sun.

The workstation comes with a 21-inch flat-screen monitor with 0.28mm dot pitch. Sun's Sparcstation 2 ships with a 19-inch monitor, according to Elitegroup.

The system also features a 535-megabyte hard drive, compared with Sun's 200-megabyte disk, the company said.

Also included are a Logitech mouse, a Type 4 Sparc keyboard, a 1.44-megabyte floppy disk, a built-in audio port, and a Sun GX graphics accelerator.

The VS-2000 lists for $15,000.

"By offering a workstation that uses a Sun-manufactured motherboard, we overcome all compatibility concerns," said Thomas Chen, CEO of Elitegroup. "We operate at a third of Sun's overhead," he added.

Elitegroup also sells Sun's VM-40 motherboard and the VG-GX graphics accelerator separately, for $3,000 and $1,600, respectively.

Elitegroup's products are available through VARs and OEMs.

Elitegroup is based in Fremont, Calif., and can be reached at (510) 226-7333.

Integrix Inc. is offering to VARs and OEMs its own manufactured components and custom-configured Sparc workstations.

Its entry-level Sparc 2 system, the Integrix SS2, lists for $2,995.

Integrix is located in Newbury Park, Calif., and can be reached at (805) 375-1055.

Aspen 486 notebook is great for graphics, lists at 386 price

By Yvonne Lee

Driving notebook prices even lower, Aspen Inc. last week began shipping a 486 system for $1,595.

"It's more or less for a person who wants a 486 but can only afford a 386," said Tony DeMaria, director of marketing.

The company also plans to introduce a high-end 486DX2 system.

The 6½-pound Aspen Personal 486 is based on a 25-MHz Cyrix 486SLC processor, and the nickel-cadmium batteries will last between 2 and 3 hours under average use, DeMaria said.

The low-priced computer offers several features particularly useful to graphics users. It has a 10-inch VGA display and a port for external 800-by-600 graphics.

It also has a scanner port for users who want to capture graphics. Users can substitute a trackball for the scanner port for the same price, DeMaria said.

The $1,595 model has a 60-megabyte hard drive; other models include a $1,795 version with an 80-megabyte hard drive and a $1,995 system with a 130-megabyte hard drive.

All systems ship with 2 megabytes of RAM, upgradable to 5 megabytes, and an internal floppy drive. The Aspen Personal 486 is available now.

Bundled software includes the Winlink file transfer program, Lap2Lan parallel cable network connection program, and Lap2Desk hard disk access program.

The Aquiline 450, to be introduced next week and shipped by month end, will use a 50-MHz Intel 486DX2 microprocessor. It will have a 240-megabyte hard drive and includes 4 megabytes of RAM, expandable to 16 megabytes.

The $3,595 computer's 9-inch screen displays at VGA resolution.

Aspen, based in Buffalo, N.Y., can be reached at (716) 626-0315.

Aspen's 486SLC-based notebook lists for $1,595 with a 60-megabyte drive.

TI's 386, 486 hybrid chips are Intel compatible

Texas Instruments Inc. has entered the Intel-compatible chip business with six processors built on Cyrix Corp.'s 486SLC and 486DLC chip designs.

Although Cyrix has been marketing its own version of the chip for six months, TI's entry into the marketplace with the TI486SLC and the TI486DLC is expected to encourage more manufacturers to use the 386/486 hybrid chips.

TI's processors include 3-volt versions of 20- and 25-MHz 486SLC processors, a 5-volt version of the same chip, and two 486DLC processors running at 25 MHz and 33 MHz.

Although they are not exact clones of Intel Corp.'s 486 processors, the TI/Cyrix 486SLC processors feature some of the 486 instruction set, 1K of on-chip cache, and a 16-bit external bus.

The 486DLC line is essentially similar to the SLC processor, but comes with a 32-bit data path.

A significant difference between the TI/Cyrix line and Intel's is that the SLC processors feature the same pin out as Intel's 386SX line. The DLC processors can use the same socket as Intel's 386DX chips. That makes it easier for manufacturers to upgrade existing designs with the new chips.

TI is already in volume production with its versions of the processors, which range in price from $59 to $99.

Texas Instruments, located in Dallas, can be reached at (800) 477-8924, Ext. 3718.

— Tom Quinlan

We didn't start the PC price war.

(But this time, we're not standing on the sidelines.)

Now we
the shot

486N Specifications

- 32-bit Intel SX, DX and DX2 processors at 25, 33, 50 and 66 MHz
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- 85-430 MB hard drive
- 3.5" floppy drive
- Three 16-bit expansion slots
- ROM-based internal diagnostic and system guide
- Integrated Flash BIOS and boot-ROM
- Multilevel hardware security
- Chip-upgradable

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intel inside

*Suggested U.S. list prices for HP 486/25N and HP 486/33N Model 1 PCs. †Press 1 for HP First, reference Document ID 6315, 6315, 6315. Microsoft is a U.S. registered trademark of Microsoft Corporation. Windows 3.1 is a product of Microsoft Corporation. The Intel Inside logo is a U.S. trademark of Intel Corporation. © 1992 Hewlett-Packard Company PPC-656 5091-8722EUS

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HEWLETT PACKARD

Tech Talk / Steve Gibson

These Windows programming guides belong on the top shelf

Developing serious commercial-grade applications for Windows has much in common with root canal surgery: It's something you only do when you have no other choice. And even though the result can bring long-term satisfaction and happiness, being under the drill is seldom fun.

Contemporary development environments and code generators have turned the creation of simple applications into a button-pushing exercise. But authoring world-class Windows applications is far from simple. So, it's only natural that a strong market for supporting gizmos and doodads would develop, and there are some really good development aids. Still, every so often an especially great goodie pops up and demands notice.

This week I'd like to share my discoveries of two incredible Windows development books and a new one-of-a-kind, highly technical newsletter.

If you've recently visited the software section of your local technical bookstore, you've probably been overwhelmed by the sheer number of books about Windows. Because just about every book with the word "Windows" on its cover tends to sell, many really awful books now fill the shelves. After investing untold hours browsing, examining, and reading through many such books, I've settled upon just three fabulous must-have books that I'd recommend for any serious Windows developer: *Undocumented Windows* by Andrew Schulman, David Maxey, and Matt Pietrek (which I discussed at length last week); *Programming Windows* by Charles Petzold; and *Windows API Bible* by James Conger.

Petzold's book is a new classic. No other book I've encountered does such a great job of developing a strong, clean, and clear understanding of the complex interactions and mechanisms of Windows programming. If you simply start at the beginning of the book and really read it, this book will turn you into a solid developer who truly understands the why underlying the what. Published by Microsoft Press under ISBN No. 1-55615-264-7, this invaluable book will show you the way.

The last book in my "must-have trio" is a recent publication of The Waite Group. Although the title, *Windows API Bible*, may suggest images of a Windows Yellow Pages, the content is anything but plebeian. Written clearly, with succinct and compelling explanations and discussions of every function and message, *Windows API Bible* provides more than 350 detailed program fragments to illustrate the application of each. The book is also organized by subject, allowing individual topics to be read and digested. This is truly one book I would never be without. Its ISBN number is 1-878739-15-8.

Finally, I'd like to bring the new *Windows Developer Letter* to your attention. This deeply technical monthly developer's letter is not for the faint of heart. The three issues I've seen so far have presented more detailed discussions (including source code on disk) of a range of useful and important topics than I have ever seen before.

The letter's author and publisher, Asael Dror of Wisdom Software, is the former engineering manager of Chips & Technologies' Windows group, where he led the team that developed the company's Wingine display system for Windows.

At a subscription cost of $300 for 12 issues, this letter is priced, designed, and written for the heavy-duty Windows technical guru who is searching for cutting-edge solutions to tomorrow's Windows application problems. You can reach Wisdom Software at (415) 824-8482 and request a sample issue to whet your appetite for more.

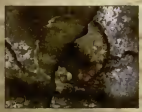
Next week we'll wrap up our discussion of Windows development tools with a look at two other great Windows development "gizmos."

Steve Gibson is the developer and publisher of SpinRite and president of Gibson Research Corp., based in Irvine, Calif. Send comments to InfoWorld at MCI Mail 259-4127, or fax them to (415) 358-1269.

The Evolution of CAD

From the beginning of time, we have tried to express ourselves through graphics.

In the beginning of time people had to use primitive design tools for creating any type of graphics.



In the 15th Century design tools were quill ink pens and crude styles of paper.

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By the 18th Century we had advanced to the drafting table with T-squares, and the dreaded eraser.

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And that's why, just like you, we're tackling real-world enterprise applications development problems. We think it's the only way to evaluate the tools and technologies available for building enterprise solutions. And we plan to write about our experience. So you can read about it and, we hope, prosper by it.

Because our job is to help you succeed at yours.

INFO WORLD

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NETWORLD

NEWS / NETWORKING

PIPELINE

DEMONSTRATIONS

Brightwork unveils management tools

Brightwork Development Inc. will show Version 3.0 of its Windows-based LAN Automatic Inventory auditing and asset management tool for NetWare LANs. Version 3.0 sports better report generation capabilities, improved support for stand-alone workstations, and support for alarms when configuration changes. The company will also announce LAN Tachometer, a network management console that allows users to create their own screen designs. It also serves as a front end to seamlessly integrate all Brightwork tools. (908) 530-0440. Booth 1646 at NetWorld.

• • •

Bytex Corp. will show the recently announced PC-based version of its Series 7700 Network Management System that provides centralized software-controlled management of its Series 7700 intelligent switching hubs. Running under Windows 3.1 on a PC-AT compatible machine, the $2,195 package offers configuration, inventory, and event management features. Also on display will be its ProSentry RMON-compatible LAN monitoring and analysis tool for Ethernet and Token Ring networks. (508) 366-8000. Booth 2470.

• • •

XTree Co. will announce its $695 network management utilities — Tools for Networks — for systems monitoring and alerting, configuration and user management, server backup, diagnostics, and virus detection. Booth 1785. (800) 333-6561.

• • •

Multima Corp. will show its new Netkeeper Help Desk Pro for tracking of service calls; it offers pager support and multiuser access. It works in conjunction with the company's Netkeeper Inventory and Configuration File Manager software. (401) 885-1916. Booth 4172.

• • •

Compex Inc. will announce its new TP3000 upgradable six-port microhub for 10Base-T networks, which support up to 24 nodes. The firm also unveils PMCIA Type-2 compatible ENET-MCIA Series adapters, ENET P/16 Combo 16-bit autosoftware configurable interface cards, and its Sonic chip-based ENET32-EIS and MCA cards. (714) 630-7302. Booth 1118.

Continued on page 52

Microsoft turns focus on LAN Manager

BY STUART J. JOHNSTON

In a move aimed at convincing users that LAN Manager is not dead, Microsoft Corp. will introduce at NetWorld this week the first of several forthcoming LAN Manager updates for Windows, OS/2, and other platforms.

Set to ship by year end, the OS/2-based Version 2.2 will provide enhanced networking capabilities to users of Windows for Workgroups (WFW) 3.1, scheduled to debut October 27, said Ruth Warren, senior product manager for LAN Manager.

The company will continue to support OS/2 with networking products "as long as it makes sense," said Microsoft executive vice president Steve Ballmer. Warren said the company has at least one more update of the OS/2 LAN product scheduled.

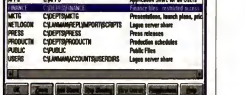
Besides providing client and administrative support for WFW users, LAN Manager 2.2 for OS/2 brings added functions to existing DOS and Windows users, simplifies network administration, enhances protocol support to span domains that extend across routers, and adds TCP/IP and DLC protocol support for WFW. It also supports OS/2 2.0 clients.

LAN Manager for Windows NT will enter beta testing with NT later this month. In coming months Microsoft also plans to introduce updates to LAN Manager on other platforms, including an update to LAN Manager for Unix, Warren said.

The new network administration tool provided with 2.2 lets administrators manage multiple servers from a single Windows desktop, rather than having to physically go to the server, said Laurie Litwak, 2.2 program manager. Network administration can be performed remotely over modem links as well.

Version 2.2 also features the Windows Network Application Starter, which enables users to run applications off the network without knowing where the applications reside and offers options for optimizing performance.

Microsoft's emerging strategy for WFW, Windows NT, and LAN Manager provides a multitiered approach to networking, observers said.



Microsoft's LAN Manager 2.2 manages multiple servers from a single Windows desktop.

A local workgroup can function quite well with just WFW, as long as a central server is not needed. Windows NT, which is now due out in the first half of 1993, will provide a WFW workgroup with server functions, and LAN Manager for NT will provide multiple server support as well as consistent administration over wide area networks, Warren said.

Microsoft has also restructured pricing. Version 2.2 will cost $1,995 per server with an upgrade price from Version 2.1 of $295. LAN Manager client software will cost $65 per user.

The company will also offer a $50 discount per user for previous purchasers of LAN Manager or Microsoft Mail to upgrade clients to WFW.

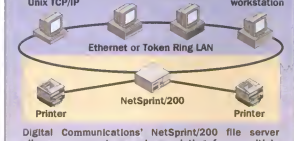
NetSprint print servers to support multiple OSes

BY KAREN RODRIGUEZ

A family of high-speed print servers designed for multiple operating system environments will be introduced at NetWorld in Dallas this week.

NetSprint from Digital Products Inc. supports concurrent printing from multiple operating systems and connects printers directly to Ethernet and Token Ring networks without a host PC, software, or TSRs, company officials said.

"With NetSprint/200, a Mac workgroup on EtherTalk or TokenTalk, a Unix workstation running TCP/IP, and an IBM compatible running on Novell NetWare could all share and print to a Hewlett-Packard LaserJet IIISi, Apple LaserWriter NTR, or another parallel printer," said Fred Schlaffer, Digital vice president of marketing.



Digital Communications' NetSprint/200 file server allows concurrent, seamless printing from multiple network OSes to a shared departmental printer.

C. ROSEN / INFOWORLD

NetSprint/100 allows two printers to connect directly to a Novell network without a PC or special software such as a VAP or Novell NLM. NetSprint/200 adds four printer ports, and supportsmultiple network operating systems.Both models have a 32-bit architecture with direct memory access to a 68340, 16.4-MHz dedicated processor. Maximum parallel throughput is 200,000 bytes per second. Also included is 512K of flash EPROM memory.

NetSprint/100, available next month, will come standard with 512K of RAM. It is priced at $695 for Ethernet and will ship in December for $995 for Token Ring.

NetSprint/200 for Ethernet with 2 megabytes of RAM, will ship in December for $995. The Token Ring version will be available in January for $1,495. Software upgrade for AppleTalk and TCP/IP start at$195.

Digital Products, located in Waltham, Mass., can be reached at (617) 647-1234.

SynOptics to exhibit low-priced, expandable workgroup hubs

BY TORSTEN BUSSE

SynOptics Communications Inc. will show this week its new expandable and low-cost workgroup hubs at NetWorld.

Available now, the LattisHub systems allow users to incrementally expand the 16-port units to support up to 80 manageable 10Base-T ports within a single repeater.

Four models are shipping: the 2803, 2804, 2813, and 2814 each feature 16 10Base-T ports and expansion slot connections.

The Models 2813 and 2814 are Simple Network Management Protocol-based cluster management units that incorporate an IPX or IP agent, allowing users to install and manage the hub system without learning IP address administration.

The management software, Lattis EZ-View 2.0, available in November, runs under Microsoft Windows 3.1, supports IPX over SNMP, and needs no dedicated PC. Management agents are available that provide fault and diagnostic tools for monitoring and controlling the hubs.

The $1,295 LattisHub 2803 and $2,295 LattisHub 2813 feature an AUI interconnect port; the $1,595 LattisHub 2804 and $2,595 LattisHub 2814 offer a 10Base-FL interconnect for support to fiber backbones.

Also shipping is LattisLink, an unmanaged 16-port hub for small businesses and workgroups. The $995 LattisLink can support PCs, printers, and servers as nodes, the company said. It offers 16 RJ-45 10Base-T ports and one AUI port contained in a wall-mountable rack.

SynOptics, in Santa Clara, Calif., can be reached at (408) 988-2400.

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Compaq tries to lure mission-critical apps

ProSignia servers accompanied by expanded customer support plans

BY TOM QUINLAN

Network administrators will be able to downsize their business operations with server support for mission-critical applications with products from Compaq Corp.

In addition to last week's introduction of server products, Compaq has expanded its service options for the ProSignia and SystemPro XL, adding round-the-clock telephone support, a three-year parts and labor warranty, and an AirSpare program for rushing critical replacement parts to corporate users overnight, said Gus Kolias, Compaq vice president of customer support and training.

The majority of new programs are an extension of the CompaqCare program introduced by the company in May, when Compaq began supporting customers for the first time, Kolias said.

In conjunction with existing programs such as RemotePak — which can automatically dial a network administrator when a critical part fails or is about to fail — Compaq is now in a position to support a user's mission-critical operations.

Although that falls short of the monitoring programs that minicomputer and mainframe companies provide, it ensures a minimum of down time for LANs, Kolias said.

If a user wants to fine tune a network using Compaq's help, a fee-based Advanced Network Support Agreement is available, Kolias added.

Although Compaq's new server systems have been widely praised, the beefed-up service may eventually win the company even more supporters.

The beefed-up service may win Compaq supporters.

"We're interested in the SystemPro XL," said Bob Holmes, a computer technology and systems analyst with Southern California Gas Co. "But for us, Compaq has to overcome the bad reputation it has for not supporting customers directly."

With the introduction of CompaqCare earlier this year and the annnouncement of new service programs for server products, "That's enough for us to at least look at using Compaq servers again," Holmes said.

Toolkit makes it easy to build EDI forms for X.400 standard

BY CHERYL GERBER

Isocor recently introduced an off-the-shelf X.400 Toolkit for Electronic Data Interchange developers in DOS environments.

The electronic data interchange (EDI) toolkit is designed to speed deployment of applications for transmission of business and legal documents — as well as image documents — between suppliers and customers.

"This toolkit simplifies the process of linking EDI applications to the X.400 backbone," said David Knight, Isocor's vice president of marketing. "We just pick up and drop off files in a format the EDI developers are accustomed to writing to."

The X.400 Toolkit contains a File Programmatic Interface (FPI) specification for an EDI client that can read and write X12 or Edifact files. The EDI client can be adapted within hours to generate and receive EDI documents based on the FPI specification, Isocor said.

The toolkit also includes two of Isocor's commercial end-user products: Isotrade, the EDI access unit that converts EDI messages; and X.400 Lite, an X.400-based DOS message server that provides electronic mail, EDI, and file transfer to LAN users.

The combination of EDI and the X.400 Message Handling System represents one of the most exciting prospects for the future of international standards-based networking, said Robert Owens, director of EDI services at Premier Hospitals' Alliance Inc.

The hospital group uses an emerging X.435 method of encapsulating EDI documents in X.400 messages to send X-rays and other attachments along with EDI data.

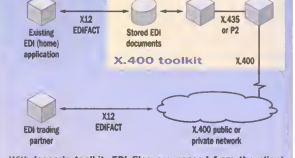
The X.400 ToolKit specifies the file-level interface to which Macintosh developers can write to adapt a Mac client to a PC or RISC-based server. However, the toolkit is not yet available for LAN-based Macs.

EDI documents adhere to formats established by the ANSI X.12 standard. But wide adoption of EDI has been slow because of disparities between EDI systems and a lack of standard methods to allow EDI systems from different vendors to work with one another, according to a study by the Gartner Group, in Stamford, Conn.

The CCITT developed the P-EDI or X.435 standard method for encapsulating EDI documents in X.400 messages.

— Kelly Higgins contributed to this story.

Isocor's X.400 toolkit for EDI



With Isocor's toolkit, EDI files are passed from the client application to the Isotrade Access Software unit, which converts them into pure X.400 format for transmission using either X.435 or P2 enveloping techniques.

Health Profiler can display network status

BY TORSTEN BUSSE

Trying to make network management information easier to understand, Remedy Corp. late this year plans to ship an applications that allows users to built graphical status reports on the general health and performance of a network.

The Remedy Health Profiler is a network and systems management application that runs in conjunction with standard management platforms such as SunConnect's SunNet Manager and Hewlett-Packard Co.'s OpenView.

"The management platforms provide a lot of device-specific information but don't offer useful ways to present the information," said Tim Lee Thorp, Remedy product line manager.

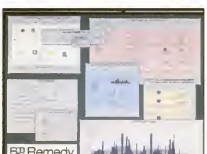
The Health Profiler allows users to present network statistics with the help of strip charts, meters, counters, dashboards and other icons, Lee Thorp said.

The applications will come with a library of predefined Views and Report templates, which can be modified to suit each user's specific needs.

Health Profiler is able to display any device-specific Management Information Base data that is available to the platform. The elements in a View window are positioned with simple drag-and-drop mouse operations.

The application can also present a profile of a particular device for comparison of current and past behavior, allowing users to determine what is normal behavior of the device, Lee Thorp said. The historical database can also be used to generate reports for user-defined periods.

Health Profiler will be available for the SunNet Manager in December, with the OpenView version following in early 1993.



Remedy's Heath Profiler renders a graphical view of network status, usage and capacity.

The Health Profiler Server, including one client license, is priced at $4,000, while the History module, which handles collection and reporting, costs $4,000. Each additional client license is priced at $2,500.

Remedy, in Mountain View, Calif., can be reached at (415) 903-5200.

Netframe deal to produce FDDI-ready superservers

BY JAYNE WILSON

Netframe Systems Inc. next year will deliver superservers that can be directly connected to FDDI local area networks.

The advance is made possible by an agreement between Netframe and Network Peripherals Inc., which will develop an FDDI-ready I/O processor board for the Netframe systems.

The FDDI I/O processor will be available as an add-in module to Netframe's line of superservers. It will incorporate an Intel 486 processor and plug into the superserver's Multiprocessor Server Architecture (MPSA) bus.

MPSA is a high-speed bus that supports 100 megabit-per-second (mbps) throughput per slot, enabling support for multiple FDDI networks. The different implementations of the Netframe superserver offer from three to eight MPSA slots.

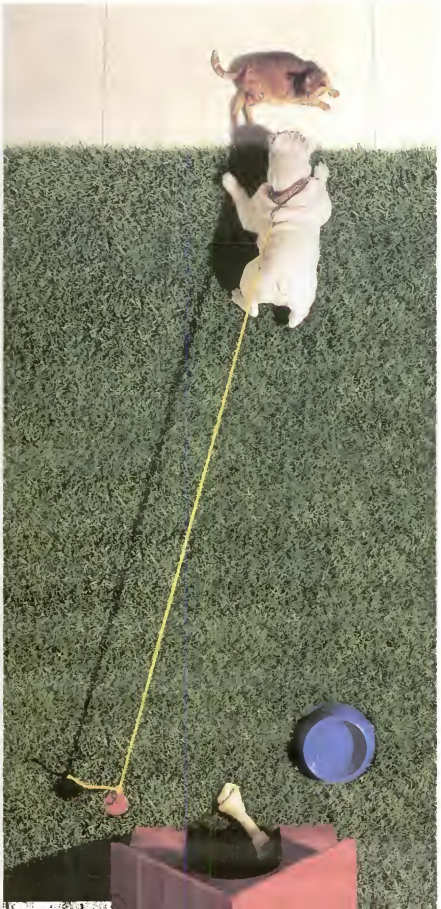
"The 486 will off-load the task-related FDDI processing from the main CPU," said Eric Johnson, hardware product marketing manager for Netframe.

The combined MPSA bus architecture and the 486-based I/O board will provide a sustained 100-mbps throughput, rather than just short bursts of power, said Gordon Stitt, Network Peripherals vice president of marketing.

The I/O processor board, which will be sold by Netframe, is slated for shipment in the first half of 1993 and will likely be priced around $4,500, officials said.

Netframe Systems, in Milpitas, Calif., can be reached at (408) 944-0600.

Network Peripherals, also in Milpitas, can be reached at (408) 321-7300.



Until now, network printers have had the same fifteen-foot restriction.

With HP network-ready LaserJets, you can put your printers where your users are.

Now you can forget about tethering your printers to some faraway server. Because network-ready LaserJet printers can be placed anywhere along your network. Just plug them in as you would PCs and you're ready to roll.

Since you're putting printers by your users, it's as if you're giving them their very own personal printer. Which means they won't have to travel as far for output. Because they're closer to the printer, they can handle some of the routine maintenance tasks, such as paper loading, themselves. Best of all, you won't have to contend with extra boxes, wires or power cables.

HP LaserJet III *HP LaserJet IIISi* *HP LaserJet IIID*

LaserJets become network-ready with separately purchased HP JetDirect interface cards. And now these interface cards are available for only $695-$895.*

For a how-to source that provides information on hooking your LaserJets into your mainframe, minicomputer, UNIX,* Macintosh, and PC operating systems, call **1-800-752-0900,** Ext. 3073 for the HP Connectivity Solutions Guide.

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Ipswitch adds database clients to its Catipult TCP/IP gateway

Ipswitch Inc., a fledgling networking software vendor, recently unleashed an upgrade to its NetWare-to-TCP/IP gateway product.

Catipult 1.2 has added support for database clients from Oracle Corp., Sybase, and Informix Inc. to access networked database servers, said Roger Greene, president of Ipswitch. In addition, Borland International Inc.'s Paradox may be used as a front end for these databases running over Catipult.

The upgrade also features a name server utility, which queries data Domain Name Servers for information about hosts enabling network administrators to determine the Internet Protocol address for a given domain name. Called Nslookup, the utility also provides Domain Name Server configuring and the diagnosis of name server problems.

The naming service is useful to network administrators because it simplifies the process of administering domain name servers, Greene said.

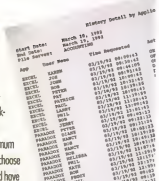
Catipult also lets users set up a Telnet server on their workstations and use any TCP/IP host to connect to their workstation and control it from a remote site. It can also set up DOS and Windows FTP servers allowing TCP/IP hosts to connect to workstation and transfer files.

Both of the above can run as Windows applications while having other applications run in the background.

Catipult 1.2 is priced at $2,975 per 30-user license. Ipswitch is located in Reading, Mass., and can be reached at (617) 942-0621.

— Cheryl Gerber

End The Guessing Game of Network Application Usage.



Introducing AppMeter. Software usage metering for networks.

Do you have too many software licenses, or not enough? Did you buy more than you can use at one time—just to play it safe? Or are you violating your license agreements by using more copies than you own?

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You can with AppMeter. It's the powerful new metering program that makes it easy to monitor and manage user access to all your network applications, whether they're DOS or Windows.

Maximize your applications to the legal limit.

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AppMeter's comprehensive usage reports help you make informed decisions about buying additional licenses, and never worry about violations.

Be as liberal or as strict as you want.

Best of all, AppMeter gives you the flexibility to enforce any usage policy you like.

You can limit usage of an application by locking out additional users when a specified maximum is reached. Or you can choose not to deny access, and have AppMeter produce exception reports that show when too many copies are in use.

Comprehensive reporting, and built-in virus protection.

AppMeter keeps track of all network application usage, and lets you quickly create a number of useful reports—on screen and on paper.

Get a snapshot of how many people are currently using each application. Generate history reports with summaries of usage over time. Touch a key and dive down a level to see the individual uses behind the summaries. Organize reports by application, by user, or by workstation. See instant bar graphs that show daily concurrent usage.

Turn on the built-in virus protection and AppMeter automatically verifies each application whenever it runs to ensure that it hasn't been altered.

AppMeter shows you concurrent application usage throughout the day in half-hour intervals, and shows how actual usage stacks up to the number of licenses you own.

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FUNK SOFTWARE

AppMeter

System Requirements: AppMeter meters both DOS and Windows applications. Requires Novell NetWare 2.1x or above, or NetWare 386. Includes VAP and NLM. No TSR required.
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Funk Software, 222 Third Street, Cambridge, MA 02142 Tel (617) 497-6339 Fax (617) 547-1031

Star-Tek's FrameScope hand-held protocol analyzer suggests where trouble spots may occur.

Star-Tek to ship hand-held analyzer for variety of LANs

BY TORSTEN BUSSE

Star-Tek Inc. will ship in December a compact, hand-held protocol analyzer that provides traffic analysis for Token Ring and Ethernet LANs.

Debuting this week at NetWorld in Dallas, FrameScope 802 analyzes network traffic and error levels on 4- and 16-megabit Token Ring and Ethernet LANs and supports coaxial, fiber, and unshielded and shielded twisted-pair, said Tracy Young, a Star-Tek product manager.

"It's especially useful if you want to look at traffic between two particular stations on the network," Young said. "It has an RJ-45 and an AUI access port, allowing you to easily attach it to any Token Ring or Ethernet network."

The analyzer suggests areas of the network that should be checked to isolate a trouble spot.

"When analyzing a Token Ring network, FrameScope may indicate a persistent error and give the station address and location and recommend you check the cable between the station and its nearest upstream neighbor," Young said.

Network statistics and packet captures are presented in bar charts. Users can also run a variety of stress tests including station echo, transmit errors, and jitter tolerance tests. The analyzer has multitasking capabilities, allowing users to run tests and simultaneously capture packets.

FrameScope will cost $3,995.

Star-Tek, in Northboro, Mass., can be reached at (800) 225-8528.

— Torsten Busse

Until now, waiting for network printing has required the same amount of patience.

HP network-ready LaserJet printers help your users get their output faster.

With an HP network-ready LaserJet printer, your users won't go begging for fast output. Network-ready LaserJets avoid parallel bottlenecks and print up to fifteen times faster than ordinary machines. Since your file server is relieved of some print-server functions, your printing network flexibility increases almost immediately. You'll enjoy faster transaction times. Greater security. And increased speed across your entire system.

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LaserJets become network-ready with separately purchased HP JetDirect interface cards. And now these interface cards are available for only $695-$895.*

For a how-to source that provides information on hooking your LaserJets into your mainframe, minicomputer, UNIX,* Macintosh, and PC operating systems, call **1-800-752-0900,** Ext. 3074 for the HP Connectivity Solutions Guide.

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Product Spotlight

Network card links three Ethernet forms

National Semiconductor **Corp. is** shipping a triple-media **network card that provides** interconnection **to three forms** of Ethernet.

The EtherNode-16AT2-CMB sports direct RJ-45 **connection to 10Base-T** (twisted pair), direct BNC connection to 10Base-2 (thin coaxial) **and a DB15 AUI connection for** 10Base-5 (thick) **networks.**

The triple-media **card also** features automatic polarity detection **and correction. It is** fully NE2000 compatible **and** supports all major networks.

The EtherNode-16AT2-CMB is available now for $249.

National Semiconductor, in Santa Clara, Calif., can be reached at (800) 538-8510.

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PIPELINE from page 45

SHIPPING

Artisoft ships starter kit that adds voice annotation

The new NetMedia Starter Kit, now shipping from Artisoft Inc., provides a cost-effective business solution for adding voice annotation to files. Priced at $849, the kit includes the LANtastic Network Operating System, the LANtastic for Windows network utility, two AE-2 Ethernet adapters, and two Sounding Board adapters. Users can record sound files, link or embed them into Windows 3.1 documents, and send them to other users via the network. (800) 846-9726.

• • •

Dayna Communications Inc.'s EtherPrint-3 family of connectors provide plug-and-play Ethernet connectivity for LocalTalk printers, modems, and other network devices. The EtherPrint-3 and EtherPrint-3 Plus models offer thin Ethernet, thick Ethernet, and 10Base-T ports in a single connector. EtherPrint-3 connects a single LocalTalk device to Ethernet, while EtherPrint-3 Plus supports as many as four devices. Pricing starts at $499. (801) 531-0600.

ANNOUNCED

Fibermux tutorial examines ATM and FDDI backbones

Fibermux Corp. has recently published a tutorial that examines enterprise backbone techniques including asynchronous transfer mode (ATM) and fiber distributed data interface (FDDI) backbones. The guide provides network managers with an overview of technologies used in building enterprise backbone networks. Users can receive a free copy of the Backbone Applications Guide by calling (800) 800-4624.

• • •

Bell Atlantic Network Services Inc. has selected the Wollongong Group Inc.'s new Management Station as the Simple Network Management Protocol (SNMP) manager for its TCP/IP-based internetwork that will encompass more than 20,000 nodes across seven states. Management Station Release 3.0 will centrally manage the Bainet internet from a corporate center and distribute its SNMP monitoring among multiple remote management stations. (415) 962-7100.

ENHANCEMENTS

NetMenu lets users add PCX graphics to menus

Version 4.2 of NET Inc.'s NetMenu Toolkit for NetWare includes PCX bit-mapped image capacity that allows users to use PCX graphics as a background for menus. A NetMenu license retails for $395 per server; users can upgrade free. (713) 974-1810.

GOING PUBLIC

Microtest files $25 million IPO of 1.85 million shares

Microtest Inc., a leading manufacturer of LAN diagnostic test equipment, has filed for an initial public offering. The Phoenix-based company will offer 1.85 million shares of stock, with the initial price starting at between $11 and $13 per share. Microtest has annual sales in the range of $24 million.

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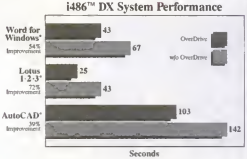

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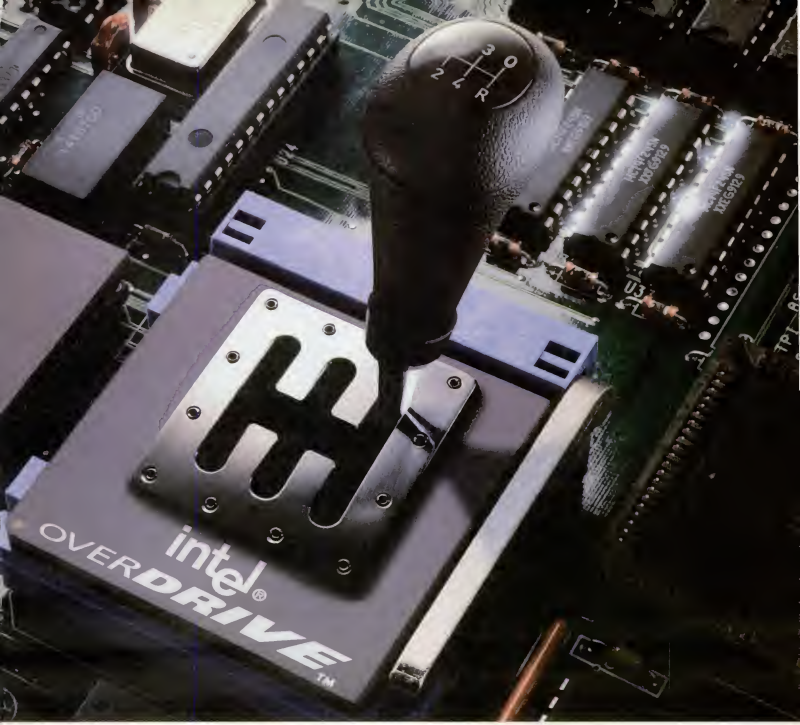

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IDG INTERNATIONAL DATA GROUP BPA

TO THE EDITOR

Quiet, please

I read the First Look on the Microsoft Sound System (September 21, page 1) and envisioned an "office of the future" filled with headset-wearing workers murmuring to their computers. Why anyone would think this is an advance escapes me. The last thing I want (on those rare occasions when I address my computer out loud) is an answer! I hate talking cars, washing machines, etc. I can hit or click on the Graph This keys faster than I can say it, and why should I talk myself hoarse anyway, when I could be listening to music (if I want to wear a headset...)? And think of the additional noise, the inconvenience of being tethered to one's desk by a headset cord, or the possibility for picking up your neighbor's communications on "cordless" headsets. Yuk!

This sounds to me like another technological "breakthrough" looking for an application, like having your computer turn on the lights when you enter the room — another entry for the book of *1001 Dumb Things to Do with Your Computer*.

Valerie Vann
CIS: 75070,304

New Age grows up?

Is Ms. Currid familiar with the software process maturity model developed by the Software Engineering Institute of Carnegie Mellon University? I doubt it, based on the content of her columns, especially the one in your September 14 issue. Her columns consistently encourage two behavior patterns that are characteristic of low software process maturity: belief in "silver bullets" as the solution to systems development gridlock, and reliance on the heroic individual efforts of systems gurus.

For those readers of her column who are searching for answers to today's system development problems, I encourage them to read *Managing the Software Process*, by Watts S. Humphrey (Addison-Wesley, 1989). Humphrey is the originator of the software process maturity model, which is derived from process management principles taught by W. Edwards Deming.

Benjamin D. Burge
Senior Systems Analyst
Indianapolis

Cheryl Currid replies: No, I haven't seen the "software process maturity model" and your letter doesn't list any of its tenants. So, I cannot tell you if I agree with it or not. But, as for my comments about IS gurus — I stand by my words. To paraphrase two of my heroes, Tom Peters and Peter Drucker, "Corporate America, especially in the classic IS ranks, is full of well-meaning but slow-moving people. Nothing happens until somebody starts pushing for it — and that takes a monomaniac with a mission."

My 20-plus years of observation — from both inside and outside corporate corridors — makes me a strong believer in the benefits that come from monomaniacs whose energy can be applied to the right mission.

Industry datebook

I would like to ask you to bring back the Convention Calendar section you used to have. As one who likes to keep abreast of the industry, I found the calendar very helpful in selecting the conventions I wished to attend.

I don't receive any other publication that has anything like it, and as a result, I have to hope that I find an advertisement for the right convention. I cannot imagine that I am alone in this request, but even if I am, I believe that this feature was a nice touch to *InfoWorld* and set you apart from the competition.

Conventioneers unite!

John Kenney II
MIS Director
Tarrytown, N.Y.

In the constant juggling of resources and ideas, we expanded To the Editor at the cost of our Calendar listing. With our own calendars jammed with notes of ever more conferences, we will consider any idea that can help readers make sense of upcoming events. — Editors

Getting a Corel fix

Regarding your story of September 21, in which users recounted problems with the divide-by-zero error in CorelDraw ("Corel offers fix for bug in CorelDraw," page 18): We have recently released a patch for CorelDraw users who have experienced problems saving certain files with text. Users with inquiries should contact Corel Technical support at (613) 728-1990.

Corel's new interactive voice response (IVR) system will guide callers according to their specific questions or requirements. This response system offers an explanation of the "divide-by-zero" error, how to restore the file if the error has occurred, and, if required, the IVR will connect the caller to a Corel representive to order the patch.

To further assist our users, Corel technical support representatives are available 24 hours a day by phone ([613] 728-1990), fax ([613] 761-9175), and CompuServe (GO CORELC).

Fiona Rochester
Media Relations Manager
Corel Corp.
Ottawa

More Mac vs. PC

Strongly disagree with Janet Lingel, who suggested in the September 28 letters column that preferring one platform over another is a matter of bigotry. Bigotry denotes an irrational dislike, and I assure you that my preference is based on specific and rational criteria.

I recently spent two days trying to link an Excel chart to a Word document in Windows. I was surprised at the number of variables involved and disappointed at the number of compromises I had to make to implement the overrated Object Linking feature.

I use Windows at work because I have to, which is part of the reason I complain. I cannot, as Lingel suggests, simply use the right system that gets the job done and leave it at that. It is precisely because I don't have two-day wrestling matches with the Macintosh and its operating system that I prefer it, use it at home, and recommend it to others.

Marti Remington
Peed Corp.
Lincoln, Neb.

In Novell's defense

The September 28 Peer to Peer column ("Novell's 'forget the customer' plan leaves buyers looking for options," page 47) berates Novell for charging end-users $100 per hour for technical support. I am a network technical manager/administrator for a large corporate network, and I have worked with the Novell operating system for almost 10 years. The price of qualified, technical personnel is not cheap these days. You cannot hire high school graduates at minimum wage and expect them to support your customers. Perhaps some people want Novell to give its services and products away — going out of business in the process.

Novell instituted the Novell Authorized Dealer program as a means of providing training to dealers to improve support given to customers. This led to CNEs (Certified Novell Engineers), which has created jobs in the process.

There is a catch-22: If you don't charge enough, you go out of business. Charge what you are worth and some people are going to complain. If you are one of those complainers, let me remind you that you get what you pay for.

Mark Vander Lugt
Technical Manager
Jenny Craig
San Diego

Proud memories

Seeing Frank Stromboe's picture in your case study "City of San Antonio revamps emergency dispatch system" (September 21, page S78) brought back memories. Frank and I led the city into the open systems mess. In 1987, while serving as the first director of information resources for the city, I decided to require Unix for all systems not residing on the mainframe. Of course, no one called it open systems in those days. I believe that most people just called it risky. Frank, Gary Moeller, and Jim Paxson supported my decision and brought our vision to fruition.

Line managers with vision and reporters working for quality publications will no doubt lead the champions of open systems to victory — risky or not.

My congratulations to Frank Stromboe for his customary job well done.

Robert L. Kay
President
Integrated Network Solutions Inc.
Boynton Beach, Fla.

Please write to Letters to the Editor, InfoWorld, 155 Bovet Road, Suite 800, San Mateo, CA 94402; (MCI Mail: 259-4127; CompuServe: 73267-1537; Internet: Letters@InfoWorld.com). Letters may also be faxed to InfoWorld at (415) 358-1269. Please include your name, address, and daytime telephone number. Letters selected for publication will be edited for length and clarity.

From the Ether / Bob Metcalfe, Publisher

PC industry schmoozes over monopolies at Agenda 93

Every September *InfoWorld*'s Stewart Alsop invites executives atop the PC industry to descend on a luxury resort for a couple of days of speeches and schmoozing — presumably setting the industry's agenda for the following year. By Monday morning we were 400 — including three IS managers — crowded into the ballroom of the Ritz-Carlton at Laguna Niguel.

Stewart's program for Agenda 93 covered three subjects: competing with the Microsoft monopoly, shipping what Stewart calls tiny little computers or TLCs, and exploiting object technology. I was surprised to learn from what followed how the last two subjects are answers to the first.

Lotus president Jim Manzi won his audience over by being nasty to Stewart, who has on numerous occasions been less than kind to Manzi. Turnabout is fair play. He then set everyone at ease about competing with Microsoft. After all, he said, Microsoft's software monopoly in the 1990s is much like Exxon's dominance of the oil industry in the 1970s. So now all we have to do is wait for Microsoft's first big software spill.

Borland president Philippe Kahn stated charmingly that technology and persistence would pay off for others against Microsoft as it has for Borland. I estimate it takes about $100 million worth of persistence.

Then came advice from Sun president Scott McNealy and Next president Steve Jobs. Both McNealy and Jobs stressed finding areas where Microsoft does not dominate — network computing for Sun, and building object-oriented mission-critical apps for Next. McNealy: Run your spreadsheets on Windows, run your company on Solaris. Jobs: Run your shrink-wrapped productivity applications on Windows, run your custom mission-critical applications on NextStep using objects.

Then Symantec president Gordon Eubanks said that objects — reusable software components — are not just important in programming but also in application analysis, design, testing, and maintenance.

Ink Development president Matt Kursh explained how object technology has implications in software manufacturing, marketing, sales, and distribution. So maybe object technology is a whole new monopoly-free ball game in which exciting new software companies can compete even without $100 million of persistence.

Then there is the crop of TLCs. Apple chairman John Sculley transitioned smoothly from $1 billion of Windows-free PowerBooks to Apple's elegant notion of personal digital assistants (PDAs) in "client/client/server" mobile computing.

Tandy chairman John Roach, on the other palm, talked about personal information processors (PIPs) for less than $500 and how 45,000 people showed up for Tandy's latest store opening.

So another way of competing with Microsoft is with TLCs — personal digitizers, information processors, and communicators — on which it's quite clear Windows won't run.

And then the Earth started wobbling on its axis as Intel president Andy Grove and Microsoft chairman Bill Gates joined Stewart on the Agenda stage for a "fireside chat." Andy told the attendees to cheer up: The industry now sells 30 million microprocessors a year. Bill told software developers to cheer up because he now sells a million copies of Windows a month.

Finally, we heard from Whittle Communications chairman Chris Whittle, who ended Agenda 93 with a rousing speech about educational reform and, incidentally, about bone-crushing monopolies. Chris is not from the PC industry; he's from publishing. His Channel One now provides advertising-supported TV news to 10,000 schools.

Chris' company is raising $2.5 billion to start a for-profit national private school system that for $6,300 per child per year — and no advertising — will be open from 7 a.m. to 7 p.m., 11 months a year, with parents, students and, oh yes, PCs (with or without Windows) helping with the teaching. He has some serious monopolies to contend with, even bigger than Exxon — much bigger. The state of California is suing Chris to remove his TVs from schools, as if our children have never seen TV ads. And the national teachers union probably has a price on Chris' head. Competing with Microsoft seems in comparison like child's play.

Bob Metcalfe is publisher of InfoWorld. *He invented Ethernet at Xerox PARC in 1973 and founded 3Com Corp. He receives E-mail via the Internet as Bob_Metcalfe@InfoWorld.com or at 524-1127 on MCI Mail.*

Peer to Peer / Wasim E. Rajput

Effective client/server systems should not keep end-users in the dark

Wasim E. Rajput is a software engineer in Allentown, Pa., and is involved in designing cooperative processing.

Realistically, true metacomputing — in which users have transparent access to computing platforms scattered across wide distances but hooked together with gigabyte backbones that provide very fast response times — is far away. Today, end-users submitting requests to a client/server application have to deal with the delays of transaction flow over networks. Although most users don't see their transaction happening, they do need to know the status of their requests.

For such cases, designing an effective transaction control system that oversees the client/server application flow is imperative. The messaging system not only monitors the application node to node, but also monitors the application links resident on the local node.

The client/server environment with its distributed philosophy has given birth to increasingly more nodes and hence has introduced a new level of complexity. Network managers must consider the issues around preserving the network's integrity on two levels. The physical connections require standard network management, detecting and fixing faulty nodes, diagnosing the nodes, and managing resources on the network. The application requires what I call transaction integrity — software issues of the application that serve to inform the end-user.

Of course, transaction integrity in client/server application design depends on network integrity. But network integrity serves only the needs of network administration personnel.

In the client/server environment, a transaction is initiated on a node, usually controlled by the end-user. The transaction flows over a subset of nodes scattered on a network. One of the most important aspects of client/server computing is the intelligent distribution of the application across nodes. In turn, the nodes execute part of the distributed application and then continue to the next node when it is complete. When one node completes a transaction, it is passed to the next — a successful design ensures that one node triggers the next transaction on subsequent nodes.

Although most users don't see their transaction happening, they do need to know the status of their requests.

Building application cooperation in a client/server application is necessary for two reasons. First, in a client/server architecture, the user request travels through a series of links. Even though most of these links are not seen by the user, a monitor on each of the links can respond to the user for a status report. In a complex installation for access to dispersed data, where the response time is longer than a few seconds, continuous updates to the initiating station can keep the user informed of transaction flow. A status bar, for example, can display a message as the pieces of the application distributed on various nodes come together.

Second, this kind of internode messaging is important for debugging an application and finding users' problems once the application is installed and running. The help desk gets better insight into the application problem and reports it to the technical group responsible for developing the application.

When designing a messaging system to get control of the transaction integrity problem, a number of issues should be kept in mind. These issues will vary from site to site and will depend on the complexity of the applications. Basically, though, the systems architects should balance their specific client/server application against these issues:

1. Setting up monitor programs across all possible links could be a burden on the network with increased traffic among the nodes that branch off the backbone.

2. If the client/server application rests on a multiprotocol platform, design of such monitor programs across links can increase the development time needed. Systems developers will have to go through additional interoperability issues among applications, operating environments, and network protocols.

3. Monitor programs over client/server links should be designed carefully, as they degrade the performance of the application.

"Peer to Peer" gives readers a forum for discussing computing and management issues. Send submissions to Rachel Parker, Opinions Editor (MCI Mail 340-4371). Submissions can also be faxed to (415) 358-1269.

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the expression

Microsoft Mail - [FY '92 Revenue]

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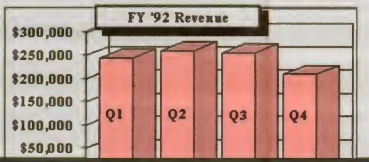
From: Coleman Barney
Date: Fri, May 22, 1992 11:57AM
To: Mike Delman
Cc: Alicia Anderson
Subject: FY '92 Revenue

As we discussed, here's the chart, by quarter, for this year's gross revenue. I've also included my sales spreadsheet SALES.XLS and quarterly report REPORT.DOC for your review. Please listen to my comments concerning the Christmas and Spring Break promotions offered to college students. Despite the increased sales volume these promotions represented, I don't think we should repeat them, given the amount of damage our boats sustained from this rowdy group of kids.



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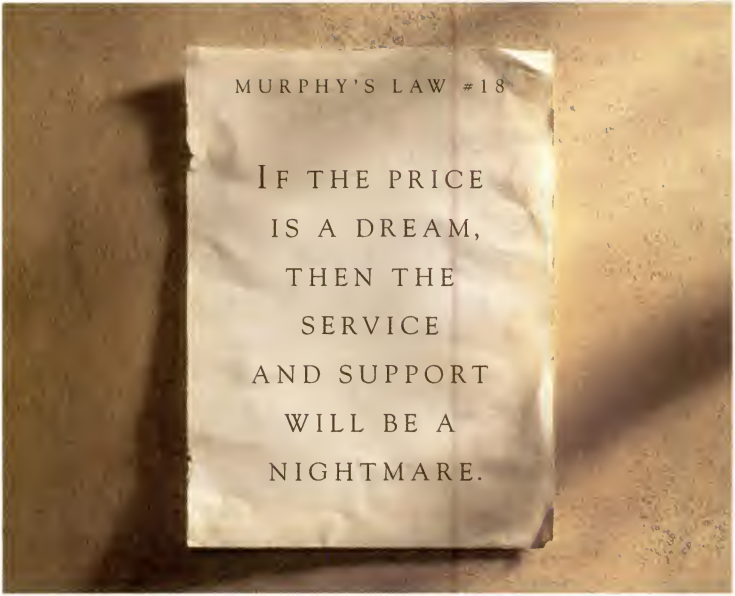

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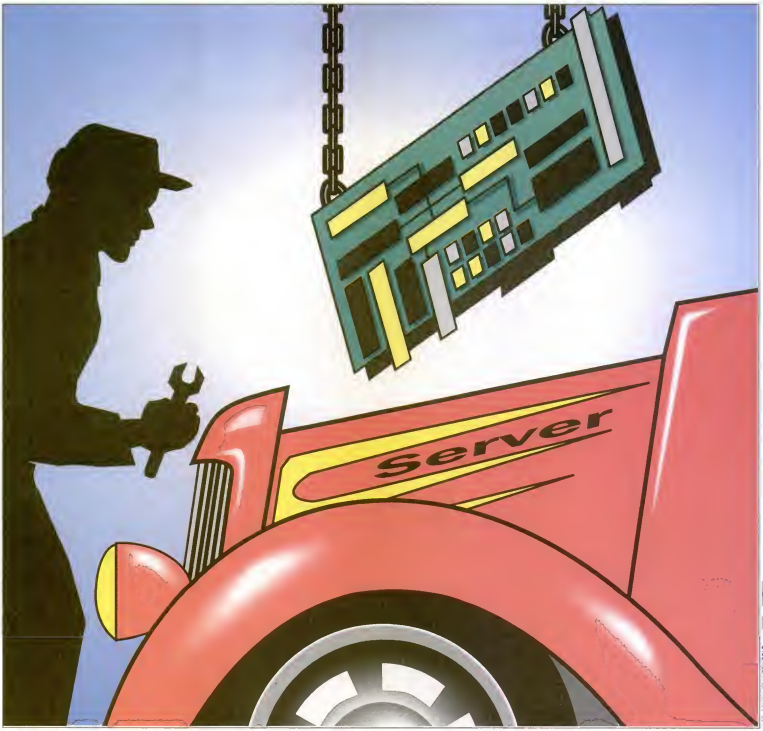

Optimizing your NetWare LAN

By John A. Arriola

With systems technology changing rapidly and a new version of NetWare just around the corner, this is probably not the best time to buy a new server, even if your network is bogging down. Fortunately, there are a number of performance-enhancing tweaks that can get your LAN back up to speed and possibly buy the time to properly evaluate future needs.

The most important thing to remember when optimizing NetWare is to view your network as a whole. A balanced approach to performance tweaking will yield the best (and most cost-effective) results. Take into account all the variables in your network: topology, transport protocols, workstation configuration, and security procedures. An intense application of performance enhancements in one area without corresponding improvement in others won't produce as dramatic a result as the same amount of effort applied throughout the system.

Performance enhancements begin at the server. The network server is the central terminus for all traffic, services, security, and management functions of the LAN. The combination of these functions and the way they are implemented has the greatest impact on overall network performance.

A NetWare file server is composed of four basic subsystems, each of which can be tweaked to boost overall system performance.

MEMORY. NetWare, Version 3.11 views memory as a single resource. In general, it is always best to have more memo-

ry. Unfortunately, the amount of memory available to NetWare is limited to 16 megabytes on ISA platforms and 64 megabytes on EISA platforms. (Proprietary hardware platforms are being designed to take advantage of NetWare's additional memory capabilities.) That means making the best use of the memory installed.

How much memory does a NetWare file server need? The best rule of thumb is to install as much memory as possible — you can never have too much. NetWare documentation shows how to calculate the amount of memory required but always assume that 4 megabytes is the absolute minimum. Keep in mind that additional RAM will be needed for each NetWare Loadable Module (NLM) and interface card installed on the server.

All NetWare drivers, applications, and services run in the same memory space. Each time a process is executed, it scans memory from the top down looking for the first available chunk of memory big enough for its use.

NetWare manages RAM through the use of what Novell describes as "memory pools." The memory pools are designed to be allocated and optimized based on whether they are being used for long-term or short-term use. Rather than preallocating large amounts of memory at startup, many resources are allocated on an as-needed basis. Preassigned values can also be set in the STARTUP.NCF and the AUTOEXEC.CFG files.

NetWare's main memory pool is the file cache buffer. It is used for caching reads and writes in memory. NetWare attempts to maximize the RAM available for file cache buffers (one of NetWare's main performance secrets) by reclaiming unused memory for the cache whenever possible. Other resources can use RAM from the file cache, but it is returned to the buffer upon termination.

Adjusting the file cache reads is important because reading from memory is much faster than reading from disk. The goal is to raise the cache hit-to-miss ratio to at least 90 percent. You can gauge the effects of changes you make to cache parameters through the Monitor utility. You will get the best performance when at least 50 to 70 percent of the memory installed is available for the cache.

Changing the file cache writes can also improve performance. Writes fall into two categories: dirty cache block writes and aged writes. Raise the dirty cache delay time and the maximum concurrent disk cache writes if the server is used heavily for writing to disk. The cache buffer and block size are best set when the block size and the buffer size match (typically 4K in NetWare). When using multiple disks, set the cache buffer size to be smallest block size of the disks.

The file cache buffers pool is another memory area that should be examined. It contains two subpools: cache nonmovable and cache movable. The cache movable pool is reserved for NetWare and is not accessible to external processes like NLMs. This pool is expandable and handles tables that grow and shrink based on allocation, such as file allocation tables (FATs) and directory entry tables.

The permanent memory pool is used primarily for directory cache buffers and packet receive buffers. Once memory is allocated from this pool, it cannot be returned. Memory allocated out of the permanent memory pool cannot be returned until the server is restarted and a new permanent pool is created.

The allocation of memory from the permanent pool highlights one potential problem with the NetWare, Version 3.11 memory model: A server could over time run out of memory due to dynamic allocations of memory from the permanent memory pool. Does this mean you should down your server every few days? No, says Novell, because the amount of memory used for these tasks is generally very small. Novell is completely rewriting the memory pools for NetWare, Version 4.0 to address this problem. This redesign should improve the overall stability of NetWare as well.

SYSTEM PROCESSOR. NetWare provides an easy way to evaluate CPU performance and bottlenecks. Just invoke the Monitor utility with the "P" flag. Monitor will display each process running on the server and identify inefficient or intensive use of CPU time. Monitor can also identify the usage of other system resources. For example, if the Monitor program shows interrupt 5 is servicing large numbers of packets and is taking a large chunk of CPU time and the server has an Ethernet card installed at irq=5, then replacing the interface card with a faster one might be a good idea.

To get the most out of your server, identify ways to save CPU cycles. One of the best ways is to replace 16-bit interface and controller cards with bus-mastering 32-bit cards (EISA or MCA). Bus-mastering disk and network cards can greatly reduce CPU usage and free up the CPU for other tasks. Bus mastering can move data in and out of system memory directly without requiring the CPU's intervention, potentially increasing overall system throughput.

Many people assume that upgrading to a faster CPU will improve network performance, especially if NetWare's Monitor utility shows high CPU utilization. However, this is often not the case. Although a CPU upgrade never hurts performance, NetWare benefits to a much greater extent from improvements in I/O processing. Unless you use processing-intensive applications or NLMs on your server, a faster processor is not likely to improve performance dramatically.

THE FILE SYSTEM. Disk caching plays a big role in NetWare's performance. Optimizing the table and data caches to suit individual conditions involves adjusting Set parameters that control reads and writes, block and buffer size, FATs, and directory entry tables. Increasing the amount of RAM available to the cache optimizes the use of the file system, so installing more memory in a server is almost always a good idea. Of course, this also means that changes to Set parameters will have the greatest effect on servers with limited memory.

The file system and cache are closely related, as all disk access requests go through the cache. Novell recommends that the file cache buffer pool be at least 20 percent of the total server work memory, but higher percentages are more desirable — 50 to 60 percent is a good rule. The volume block size should match the cache buffer size whenever a single disk volume is used. Set the Cache Buffer Size in the SERVER.CFG file. (The block size is set when the volume is created.)

Servers with AT-type (IDE) drives should not use the ISADISK.DSK disk driver that ships with NetWare, Version 3.11. The IDE.DSK supplied by Novell (and available on Netwire via CompuServe) will provide better, more reliable performance. In fact, the older ISA DISK driver can cause compatibility problems with certain IDE drives. ESDI drives should use the newer ESDIDSK driver also available on Netwire.

To maximize disk performance, load the name space when the volume is created and limit volumes to one name space per volume. This cuts down on the number of directory entries (and amount of cache memory) needed. Setting the immediate purge of deleted files to "off" will avoid tying up the server with delete commands while other higher priority tasks can be performed. You can manually purge when deleted files are purged.

Turbo FATs can speed up access to large, randomly accessed files. Use the SET TURBO FAT REUSE WAIT TIME to adjust the amount of time the FAT is kept in cache. You should also take a look at the SET DIRTY CACHE DELAY TIME. Increase this value to boost the server efficiency when small file writes are most common.

Turning off the ENABLE DISK READ AFTER WRITE VERIFY can improve disk response time. If you have a disk that performs a read after write automatically (as most SCSI disk drives do), this will remove the overhead involved in redundant verification checks. Don't neglect disk mirroring — it can also be a real bottleneck. If your budget allows, use bus-mastering host controllers to perform mirroring functions — they don't chew up CPU cycles to perform these tasks.

Finally, if finances permit, disk arrays that "stripe" data across multiple drives offer a real performance boost. These drives can keep up with even the fastest controllers.

COMMUNICATIONS. Optimization of communications between the server and the workstation begins with the use of the largest packet size possible for the type of media you are using.

The default packet receive buffer size for a NetWare, Version 3.11 server is 1K (1,024 bytes). To enable the server to use a packet size other than the default of 1K, you must modify a Set parameter in the server's STARTUP.NCF file. "SET MAXIMUM PHYSICAL RECEIVE PACKET SIZE= XXXX." This is true even if the network interface card driver specifies a packet size of 4K (Token Ring networks typically use 4K packets, for example) and the hardware has been configured to handle 4K packets.

Be careful not to exceed the largest client packet size in use on the network. For example, if you specify 4K packets on an Ethernet (which is limited to 1K packets), you will waste 3K for every communication buffer allocated.

There are two situations when the client and server may not be able to use the maximum packet size: when the server has been configured to support a different packet size than the client, and when the packet communications between the server and the workstation must pass through an intermediate router to get to the server. The solution is to standardize packet size to the greatest degree possible and to avoid mixing packet sizes across the LAN.

When a packet must pass through an intermediate NetWare router (either an external router or a server acting as a router) the packet size is reduced to 512 bytes, a default created by Novell's ARCnet cards. Normally, NetWare will automatically adjust the packet size; if you've manually specified a larger packet size, data will not be transmitted through the router.

The best solution to the problem of packet sizes is found in the Large Internet Packet exchange NLM. Novell's LIPX.NLM, formerly called

Recommended packet sizes

Token Ring - 4 megabytes	2,154 bytes
Token Ring - 16 megabytes	4,202 bytes
Ethernet	1,130 bytes
ARCnet*	618 bytes

*Some ARCnet boards support up to 4K packets - check with vendor

Calculating NetWare's memory requirements

1. Figure the amount of memory needed for each DOS volume. Required memory = (.023 X volume size in megabytes) / block size.
2. Add the memory needed for volumes with added name space. Required memory = (.032 X volume size in megabytes) / block size.
3. Add 2 megabytes for NetWare, plus the RAM requirements of any NLMs and network interface card drivers.
4. Round up to the nearest megabyte. The minimum amount of memory is always 4 megabytes.

Executive summary

- Take a 'systems' approach; don't optimize one subsystem without examining others.
- Add as much memory as possible to the server.
- Avoid using more than one name space per disk volume.
- Use the monitor utility to identify bottlenecks.

BIGPAK.NLM, allows the largest common packet size to be used when a workstation and a server communicate through an intermediate router. This feature can decrease response time on any NetWare network where workstation clients need to go through more than one NetWare server to get at the requested data. It also addresses another NetWare limitation: a design optimized for single network segment operations. With the size of networks growing and the number interconnected networks climbing rapidly, this NLM helps NetWare catch up to the current environment.

Another way to improve throughput is to use packet bursting. This reduces the overhead in handshaking. Packet bursting was primarily designed for use over wide area network links, but it may offer some improvement for LANs as larger packets can be sent for each request. Most testing shows that large file transfers are the best candidates for burst mode on local network segments.

Communications function most efficiently when there is a minimum of dropped packets. If the network or receiving PC is too slow to handle the incoming data (in either burst or normal modes), packets will be dropped, which means the sender will have to retransmit them. You can check the number of dropped packets through the Monitor program. If many packets are being dropped, the size of the receive buffers should be increased. Increasing the receive packet buffer size allows the server to buffer the incoming packets.

Another bottleneck is the use of too many protocols on one network segment. Multiframe or multiprotocol support can slow some network adapters to a crawl. Devise network schemes that limit the number of protocols used on each network adapter.

In addition, run the Monitor utility and look at the packets enqueued for send count. If this number is a significant portion of the total packets sent, the network adapter is not keeping up with demand.

For more esoteric tuning, Novell recommends using the largest frame size allowed. Use the SET MAXIMUM PHYSICAL RECEIVE BUFFER SIZE and use LIPX.NLM when packets cross intermediate routers.

Perhaps the most important part of tweaking communications performance is to monitor the network interface card statistics using the MONITOR.NLM. Keep an eye on the general errors (retries) and the enqueued send counts. Always remember to allocate communication buffers based on observing peak usage over time. You don't want to check up a lot of memory if peaks are few and far between; likewise, periods of light use won't give you a clear picture of network performance.

FINE TUNING. NetWare's dynamic setup tuning feature ensures that your network is always performing reasonably well. Nevertheless, there is always room for improvement, especially in areas of communications and use of memory. Because what may work in one environment may not be satisfactory in another, it pays to carefully examine each subsystem and monitor its performance over time to identify network bottlenecks. Tools like Novell's LANalyzer can display specific server activity broken down by the type of packets being processed and the number of writes, reads, and other activities.

NetWare utilities such as Monitor can also aid in locating potential bottlenecks. But remember that an adjustment to one subsystem often means little without a corresponding enhancement in others. Only when an optimization strategy takes into account all of the aspects of network performance will a real gain be realized.

John Arriola is a network consultant and former Senior Systems Analyst with the InfoWorld Test Center.

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IS proves critical to Hurricane Andrew relief effort

System helps Dade County assemble important data in aftermath of storm's destruction

BY DAVID BAUM

On the evening of August 23, residents of Dade County, Fla., began to take cover. Hurricane Andrew was heading toward shore, and all indications were that it would be a big one.

At 4:00 the next morning, the storm front lashed into coastal communities throughout the southern part of the county. By dawn, the hurricane had moved inland, leaving a six-mile-wide swath of destruction in its wake. By noon on August 24, Andrew was in the Gulf of Mexico, and thousands of South Florida residents had lost their homes in one of the worst natural disasters in U.S. history.

REAL-TIME DATA CRITICAL. Even before the winds had died down, workers at Dade County's Office of Computer Services and Information Systems (OCSIS) were working at a feverish pace assembling the information kept at various agencies throughout the region. County departments maintain databases on everything from property values to hazardous waste sites, and a Geographic Information System (GIS) provides electronic mapping capabilities for displaying this data on workstations throughout the county. This information proved critical to both the rescue and rebuilding efforts.

"One of our first requirements was access to the building and zoning systems to estimate damages," says Louis Lezama, OCSIS division director for administration and planning. "This meant quick access to the property appraisal files in the property database."

Relief workers also needed to know the locations of hazardous substances, likely flood zones, the types of dwellings, and the nature of the infrastructure in each affected area — information readily available on Dade County's GIS.

The system also proved indispensable in giving relief officials from various agencies comprehensive and easily interpreted information about the area.

"People from the federal agencies weren't familiar with the area," says Marty Leahy, in the director's office of OCSIS computer services and telecommunications office. "They needed to know where things are. What areas of the county have been hit hardest? What is the degree of damage in each area? These were the first questions they asked. They had to plan their reactions to get to the most important places first.

"Our electronic mapping system was instrumental in automating this process," Leahy continues. "Finding their way around, figuring out where to set up equipment, deciding where to go first, and how to get there. It helped with the prioritization as well as logistics of getting relief centers set up. And it helped us determine which emergency services could best respond to particular emergencies."

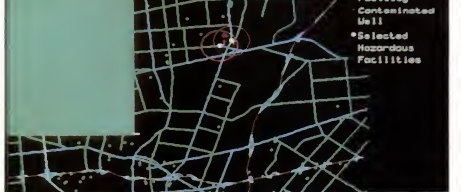
Dade County's GIS is used on a day-to-day basis for all sorts of activities, including analysis of property values, creation of zoning reports, crime analysis, hazardous materials tracking, and traffic engineering, to name a few. Once the hurricane relief efforts began, the system was put through its paces like never before.

"The land is the key to everything," Leahy explains. "Once you reach a certain size and complexity, it becomes almost impossible to maintain mapping information manually. You can only do so much with push pins and color codes. And there is no way you can do geographic analysis on paper maps. It would be much too time consuming."

Dade County's GIS makes heavy use of Arc/Info, a GIS support application from The Environmental Systems Research Institute of Redlands, Calif. Arc/Info integrates geographic and statistical data stored in disparate databases. The resulting maps are displayed on workstations, where they can be edited, analyzed, and queried. GIS systems like this are commonly used by local governments as well as private industry for everything from petroleum exploration to forest management.

Most of Dade County's databases are stored on an IBM 3090 mainframe, with more than 700 gigabytes of data accumulated over the last 30 years. The GIS system itself runs on a Digital VAX 6520 running VMS, along with supporting software for database access and reporting.

VAXstations and DECstations are deployed at departmental locations throughout the county, relying on the VAX as the GIS data server. These workstations handle the processing required to create the various layers of data for display on the electronic maps.



Environmental Systems Research Institute's Arc/Info helps government officials keep tabs on things such as hazardous wastes and displays the information over a map of the area.

Some processing takes place on front-end client workstations; in other cases, terminals access data on the VAX directly. The various databases of information, such as property statistics, crime, and fire, can be quickly depicted.

Leahy describes Dade County's GIS architecture as a multilevel client/server environment with multiple servers. A mainframe stores most of the data, and the VAX minicomputer is the server for the mapping workstations. The workstation is where the real processing work is done. Users viewing maps can "drill down" and see more detailed information, such as where hazardous waste sites are located.

> **"[Our electronic mapping system] helped with the prioritization as well as the logistics of getting relief centers set up."**
>
> *Marty Leahy*

With relief activities taking place throughout the county, off-site access to data is also important. OCSIS has set up T-1 network links for Federal Emergency Management Agency employees to provide remote access to the mainframe data.

"The pace of activity has not diminished at all in the weeks since the disaster," Leahy reports. "If anything, it has escalated as the rebuilding efforts pick up speed. Requests for information have increased. We don't expect them to diminish for quite some time," Leahy adds.

PREPARING FOR THE NEXT EMERGENCY. Information officers of Dade County are now asking themselves if a general-purpose geographic disaster system could be designed for implementation in other locations. A standardized GIS for natural disasters could make this technology affordable for areas of the country that don't have the resources to build a system like South Florida's.

"You need to have an awful lot of information very quickly," says Jose Otero, OCSIS division director of general government services. "If a disaster scenario hasn't been considered ahead of time, it can be real difficult to respond to an emergency situation."

Dade County was fortunate to have a system in place that could be used in relief and recovery efforts. But many areas of the country don't have any such disaster systems on which to rely. Otero and others at OCSIS would like to use their experience to develop a system that other municipalities can use.

"The key is going to be to package this kind of capability and transfer it so that other areas can take advantage of it," Otero says. "We are looking for funding now to help us with this development project."

OCSIS would also like to enhance the system and add more capabilities, including information about the water and sewer infrastructure and the locations of fire hydrants and traffic signals. In addition, the county plans to place more emphasis on keeping the data current so that it is accurate when the next emergency strikes.

"I would like to see the information organized in a production library where everything can be available to everyone," Otero adds. "We could stand to improve our data gathering systems, and to implement more flexibility."

All in all, however, Otero and his coworkers are pleased with their ability to respond effectively in their county's time of need. They may not be able to control the weather, but they can use their information systems expertise to quickly respond to it.

David Baum is a Santa Barbara Calif.-based writer specializing in distributed applications.

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IS Profiles / Alice LaPlante

Involving users early makes application development smoother

Times are tough for a lot of companies. And that means IS managers trying to sell their bosses on an automation project need to be careful they know what they're talking about. We've heard enough stories about poor technology decisions resulting in red faces — or worse, pink slips. So I was especially impressed with the way Russell Leavitt prepared for a new distributed computing project at his firm.

Leavitt is director of information services at Connecticut Natural Gas, a utility located in Hartford. CNG was working harder and harder — and spending more and more money — attempting to keep its systems current with an ever-increasing load of regulatory and rate changes.

"Our Unisys mainframe was over 20 years old and was terribly obsolete," Leavitt says. The software that ran on it — the customer information database: that was the very heart of the utility's business — was also aging. Originally written in 1972, and enhanced and patched together over time, the worn-out code had gone through three different operating system conversions and by 1990 was on the verge of complete collapse.

"It's kind of like poor wiring in an old house: It can sometimes take you longer simply to find the problem than to correct it," Leavitt says.

Because the system was so poorly documented, making even simple changes took dozens of person-hours, according to Leavitt. And when a more complicated request came in — for example, a new kind of sales tax levied by the state — Leavitt and his staff would spend huge amounts of time scrambling to put the functionality in place.

Clearly, it was time for a change.

PLANS FOR THE FUTURE. In 1990, Leavitt formulated a long-range IS plan to determine how much processing capability CNG would need in the coming decade. He also took a long hard look at the IS budget. The first decision was a basic one: which hardware platform to buy. Leavitt decided that an IBM 3090 mainframe offered the best price-performance, as well as the most options for implementing basic off-the-shelf applications.

First he converted the organization's straight accounting and financial applications from the Unisys over to the IBM platform. With so many mature applications available, that was the easy part; Leavitt knew the real test would come when it was time to replace the critical customer information system (CIS).

Because the success of this application was deemed so crucial to CNG, Leavitt knew it couldn't be built in a vacuum — the input of many people would be needed. To help him build an effective coalition, Leavitt went to some outside experts: Computer Science Corp., a nationwide consulting firm. "I wanted to do this right," he says. "I thought there were people out there who could help."

CSC helped Leavitt round up 50 employees from every area of the company that would be affected by the new system: credit and collection personnel, engineering employees, customer relations, distribution, and — of course — IS. "We involved [everyone]," Leavitt says. "We went through four months of discussion and evaluation, and eventually came up with a list of essential requirements for our new CIS system."

SUPPORT FROM THE TOP. As an illustration of just how important the senior executives at Connecticut Natural Gas thought the project was, Leavitt says he was allowed to take 20 end-users away from their full-time jobs in order to work on the system at a time when CNG was downsizing its staff. This was in addition to the 50 people he had originally gathered to develop system requirements.

Leavitt sequestered these 20 full-time employees in a separate building for the duration of the development project to make sure that the end result was based on user input.

LEARNING BY EXAMPLE. Then Leavitt hit the road. As an active member of the CIS committee for the American Gas Association — a national forum for utility professionals to share experiences — he had made contacts with a number of IS professionals throughout the industry. He went through his Rolodex and visited as many utilities as he could that had recently installed CIS systems. "A system like this represents a major investment and thus a major risk," Leavitt says. "I wanted to see what experiences others had had.

"If there was one thing I learned from visiting other sites, it was that this type of project couldn't just have the part-time support of the end-users," Leavitt says. "I needed them working side by side with the developers for the duration of the project."

OUTSIDE HELP. For actual coding of the new applications, Leavitt again went outside. He put the CIS project up for bid and Andersen Consulting was hired to do the job. The reason: Andersen promised to put in place a CIS application that could be migrated over time into a full client/server environment when that technology became available.

Andersen also promised to integrate the CIS system with another application CNG was developing with Andersen at the time.

Andersen's Customer 1 system is the basis for the CIS system at Connecticut Natural Gas. Leavitt says CNG's installation is the third implementation of Customer 1, after successful installations at Baltimore Gas & Electric and Atlantic Gaslight. Leavitt should know; he checked with each organization. "I'm always astonished that people ask for references from vendors and then don't bother to check them out," he says. "That's the number one rule when putting in a new system."

Customer 1 is mainly host-based, written in DB2 for the IBM 3090, and delivered on PCs in a 3270 window. This arrangement is less than ideal, Leavitt admits, "but there are no client/server CIS applications available today for the utilities industry," he says, regretfully. "There's one under development that I know of, but it would take a lot longer to implement than the Andersen product."

Work 1, the other application CNG developed in cooperation with Andersen, is fully client/server. The host portion is DB2; the client runs on OS/2. Since both systems are Andersen products, they are completely compatible and can be delivered on the same 386- or 486-based systems.

Both systems were written with the help of Foundation, Andersen's set of CASE tools that will enable the migration to client/server, according to David Parks, a partner at Andersen Consulting who worked on the project. "With Foundation, we have the ability to migrate CIS one function at a time over to a truly client/server environment," Parks says.

Leavitt knows a little about personal migration, too — he's been all over the place at CNG. After spending eight years in IS at Connecticut Natural Gas, he was transferred into the corporate planning department for five years, specifically so he could learn about the business he was helping to automate. Now he's back in IS.

"Our management decided to take a number of people from different departments — such as IS, gas supply, rates, regulatory systems, and human resources — and put them through a number of different disciplines in order to understand what went into strategic corporate planning," Leavitt says. After five years, these employees were then migrated back into operating areas, "hopefully putting what they learned to work," Leavitt says.

"Most IS people at that time were just in reaction mode," Leavitt says. "They didn't have time to look ahead; they were just dealing with today's problems. I think that experience really helped me with our CIS project."

Alice LaPlante is a Palo Alto, Calif.-based freelance writer and a former InfoWorld *editor.*

IS Director Russell Leavitt hired consultants, outsourced application development, and locked 20 Connecticut Natural Gas employees in a building in his quest for the perfect customer information system.

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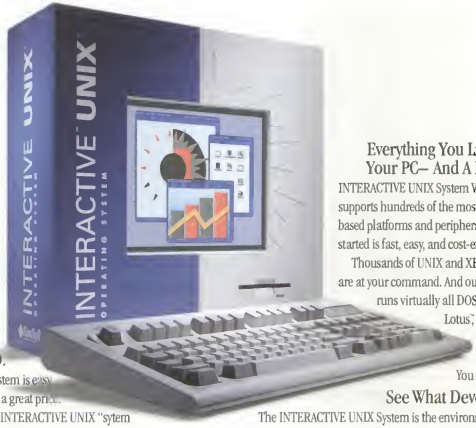

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IW-10/12

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New Age IS / Cheryl Currid

Sponsoring 'Toys for Techies' encourages creative thinking

I've always admired people who got their Christmas shopping done early. You know the types, making lists and checking them off as they plow through October sales. By the time they finish their Thanksgiving turkey, they're done — ready to enjoy the holiday season while the rest of us fight for crowded mall parking spaces and endure the errors and overcharges from rude sales clerks.

This year I decided to change my last-minute ways, especially for my favorite shopping excursion — the search for useful Toys for Techies.

Regular readers will recognize this pitch. I think corporate IS shops should sponsor some intellectual fun and do some shopping at the end of the year. As I see it, Toys for Techies is an excellent way to deal with spare dollars at the end of the year. Spend them.

Here's my rationale. Many corporate managers end up with a few extra dollars in expense budgets at the end of every year. And most companies don't let the money get carried over to the new year — so managers have to use it or lose it.

Rather than letting good hard-won budget dollars go to waste, I suggest you start a program to let the troops make a Christmas shopping list for unplanned technology treasures. I'm not talking about outfitting everyone with the latest Nintendo game. I'm talking about products that have some redeeming business benefit.

Besides, year end is often a slow time for IS departments. Few folks think about starting new systems projects in December, and half the company takes off for extended holiday vacations. Even hot help desk lines tend to cool off toward the end of the year. So there's extra non-pressure-cooker time at the end of the year. Rather than let it go to waste, why not use it to learn about something new? Hence, Toys for Techies. It has a valid business purpose. (So much for the sales job.)

What toys qualify? Candidates for Currid's Toys for Techies List must be fun to use and helpful to the business. It could be a productivity enhancing tool, an easy-to-use networking tool, a product to produce better and faster presentations, or something that provides any type of support for the business mission. The "toy" doesn't have to be totally for techies — we'll include mere mortal corporate citizens in the fun. Besides, they are the ones that often can benefit from a whizmo new technology tool.

This year I actually started an early search for products to make Currid's list. I've found so many that I've decided to open my bag of goodies later this month, rather than wait until all the Christmas decorations are up.

IS managers should also beat the December rush. Start making your lists and checking them twice. Survey users over in the marketing group, finance, manufacturing, personnel, and sales. Figure out if they are working on some projects where technology toys (um, I mean tools) could help out. Also check to see if there are any extra dollars falling to the bottom of their budgets that could be used to fund the fun.

Finally, check in with management. Make sure you're not violating some company policy by diverting a few dollars in the direction of research and development. Many senior managers will wince when they first hear of the idea — but if you can convince them of the benefits, they'll probably throw in a few extra bucks themselves.

After all, we are headed toward the gift-giving season. And we are talking about giving people in the company the gift of better productivity or more cost-effective technology.

Stay tuned over the next couple of months as Currid creates a list. And if you've got a suggestion of your own, let me know. Send me an E-mail over CompuServe at 75300,2660 or MCI Mail CCURRID, or a fax at (713) 789-5994.

Cheryl Currid, president of Houston-based Currid & Co., focuses on helping clients assess, apply, and organize for new information technology. Her CompuServe address is: 75300,2660.

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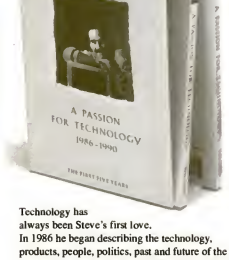
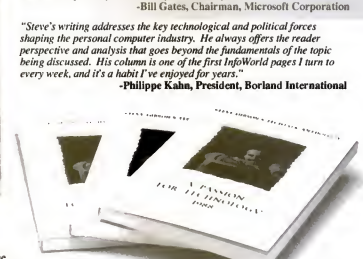
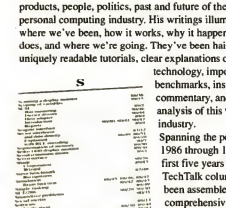


"Steve is a technical guy who brings complex issues down to Earth. Throughout the years his opinions and insight have served as important benchmarks for the personal computer industry."
-Bill Gates, Chairman, Microsoft Corporation

"Steve's writing addresses the key technological and political forces shaping the personal computer industry. He always offers the reader perspective and analysis that goes beyond the fundamentals of the topic being discussed. His column is one of the first InfoWorld pages I turn to every week, and it's a habit I've enjoyed for years."
-Philippe Kahn, President, Borland International



Technology has always been Steve's first love. In 1986 he began describing the technology, products, people, politics, past and future of the personal computing industry. His writings illuminate where we've been, how it works, why it happened, what it does, and where we're going. They've been hailed as uniquely readable tutorials, clear explanations of complex technology, important benchmarks, insightful commentary, and critical analysis of this vital industry.



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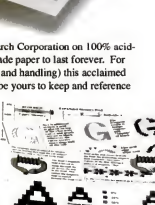

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IN THE ENTERPRISE OCTOBER 12, 1992 EDITORIAL SUPPLEMENT NETWORK WORLD

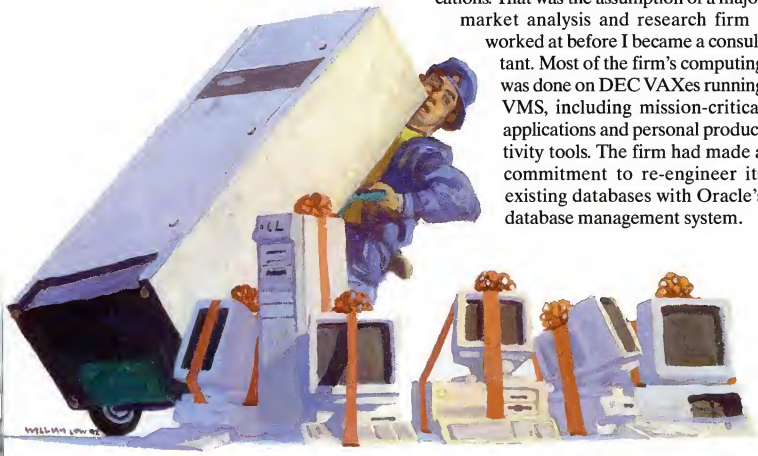
Downsizing with NetWare

THINK small

IS managers can let go of the mainframe mindset and downsize critical applications to the LAN. Really.

By Chris Spence

Big-iron managers are a skeptical lot when it comes to downsizing. They firmly believe that only mainframes have the power, security, and control needed for mission-critical applications. That was the assumption of a major market analysis and research firm I worked at before I became a consultant. Most of the firm's computing was done on DEC VAXes running VMS, including mission-critical applications and personal productivity tools. The firm had made a commitment to re-engineer its existing databases with Oracle's database management system.



MICHAEL WILLIAMS

INSIDE

CASE STUDIES
– Willow Creek Comm. Church
– Pacific Enterprises

IMPLEMENTATION STRATEGIES
– NLMs supplant mainframes

PRODUCT ROUNDUP
– Downsizing data

(What is it?)

It's an SNA gateway. (That's nothing new.) **It's also a local router.** (Excuse me?) **It's an SNA gateway *and* a local router** (You mean in one product?) **in one product. So it provides you with two solutions in one:** (Let me guess; the functionality of a gateway along with the performance of a router.) **the functionality of a gateway combined with the high-performance of our router's SPARC processor.** (I was close.) **Since this new product** (I think it should be called a gateway-router.) **performs two functions at once, it offers unprecedented levels of administrative convenience and manageability.** (But does it access multiple LANs?) **It also accesses multiple LANs, including Token-Ring, Ethernet, and LocalTalk,** (Ask a stupid question...) **and supports mixed PC environments such as Windows, Mac, and DOS.** (Holy Toledo.) **Naturally, our Netway gateway-router** (Hey, that's *my* name for it.) **can route Novell IPX and AppleTalk protocols.** (And?) **and comes complete with powerful 3270 services like terminal and printer emulation.** (I wonder who came up with this thing.) **As you might have guessed by now, the company behind this revolutionary product is Avatar,** (I should have known.) **leaders in SNA connectivity for over a decade.** (Must be about time for the obligatory 800 number.) **For more information, and our free "Gateway-Router Guide to Network Manageability," send in the coupon or call 1-800-AVA-3270.** (A free gateway-router guide? You must have read my mind.)

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This project would require a very detailed understanding of many applications that had been written years earlier by programmers that were no longer with the company and had provided little or no documentation. The visionaries of this project saw it as the "be-all-end-all" database application — a major mistake. It was never to become a reality. After two years, several thousand man hours, and a couple million dollars, the project was still not complete.

As the development process progressed, some of the old applications were abandoned so that resources could be redirected at the new system. Meanwhile, the analysts who were to use this new database were concerned about being able to deliver the required data to their clients. The old systems, in many cases, were no longer in place, and the new systems were incomplete and or untested.

A MICRO SOLUTION. At this point, a small group of the analysts put their heads together and designed a somewhat scaled-down version of the monolithic "LSD-database" and decided to use Borland's Paradox DBMS running on a 386/33. In four months the application was up and running and producing all the critical data on a standalone PC. Obviously, this junior database was not all the VMS/Oracle platform was to provide, but it was probably close to 70 percent, and again it took only four months from design to production.

Still, management refused to accept this micro-based solution and, at one point, even went so far as to ban all micro-based database development. However, the junior database remained in use and later was easily converted to a multiuser version running off a Novell NetWare 3.11 server.

Eventually the Oracle project died, unfinished. Management realized there was no end in sight. There were several factors I attribute to the project's demise: the application was to be everything to everyone, the scope was almost beyond comprehension, and the resources dedicated were nowhere near enough.

There were constant design changes that, in many instances, were unnecessarily frivolous. No matter how complete certain modules were, everyone wanted this or that changed — too many cooks. Second, the development tools chosen were not very easy to use or understand (this is true of the majority of minicomputer and mainframe development tools).

Also, while our developers and programmers were quite competent, they were not given sufficient training and time to learn the new tools and techniques. As a result, it was not unusual to find a module of the application that dead-ended, requiring a major rewrite to implement even the smallest changes. That translated into high maintenance costs for an application that was not yet completed.

Strangely, the mainframe environment seems to encourage the kind of big thinking that often results in developers and IS managers painting themselves into a dead-ended corner. Perhaps big thinking is why the prospect of downsizing is not appealing to some mainframe-oriented IS organizations.

THE PC APPROACH. IS managers with PC experience have no trouble, however. And thanks to the tools available in PC environments, design changes don't turn into nightmares for PC developers. The market research analysts working in Paradox are a good example: They approached the problem with only an understanding of what the application needed to do for them, but not necessarily what a programmer needed to do to accomplish the task. It's a classic PC-oriented scenario, right down to the predictably successful results. The Paradox application is still in use today.

For several years, IS managers had good reason to be skeptical about the worth and feasibility of downsizing. PC hardware was not quite up to the task, and network operating systems were not yet offering a solid foundation for mission-critical applications. But that is no longer true. PC hardware has come a long way, due to the acceptance of the EISA bus technology and the 486. Many high-performance PC subsystems are now available, offering better performance than many minicomputers costing several times as much. Novell's NetWare 3.11 is also largely responsible for making downsizing a reality.

Why does NetWare merit the trust of the IS manager? In some ways, its redundancy features surpass the capability of the mainframe to guard against failure. The cost of disk duplexing with NetWare is relatively inexpensive: about $4,000 for a 2-gigabyte mirrored drive including a high-performance disk controller.

With a duplexed system, a drive or a controller can fail, and the system stays up. Only the console operator is aware of the failure, and he or she can schedule the repair for an off-hour time. There are also drive arrays that are "hot swappable." The drive can be replaced while the system is running in a matter of a few minutes. While volume shadowing (mirroring) on a mainframe would provide redundancy, the associated costs are comparatively huge.

For a minicomputer or mainframe environment, software licensing for such functionality generally starts at $25,000 per site. In contrast, the software portion of NetWare duplexing is part of the network operating system — no added costs are incurred except for that of hardware.

Perhaps big thinking is why downsizing doesn't appeal to mainframe IS.

My mainframe experience taught me that it wasn't unusual for a disk drive or controller to fail and be down for an entire day while someone repaired it. Thus any system my company, PC Edge, recommends to a client is redundant. In addition to duplexed drives, we also recommend a second PC with the same hardware configuration, minus the drives, to minimizes downtime as much as possible.

For example, if a motherboard of the main server fails, the drives can be plugged into the backup system in seconds. Your downtime is less than 10 minutes. If you have a multiserver environment, you don't need a hot-swap PC for each server the hardware is consistent.

Finally, consider the benefit of reducing user dependency on only named dumb terminals. On a mainframe timeshare system, each timeshare process takes cycles away from the CPU, which bandles all processing tasks. If the computer delivers only 10 MIPS at the outset, you can't afford to lose cycles. With NetWare, as with other network operating systems, most of the application processing is done at the workstation. If your desktop is a 386/33, you have roughly 5 to 7 MIPS at your fingertips most of the time — show me a terminal that can do that.

WILLIAM LOW

DISTRIBUTION IS KEY. Each user needs a PC in a LAN environment. What about that additional cost? For those that have PCs, a network adapter can be added for under $200. For those that require PCs, a 386/33 with DOS, Windows, and a couple of essential Windows applications is about the same price as an IBM 3270 dumb terminal. Terminal users can also access many NetWare/DOS applications through a NetWare access server.

Distribution of the processing lets you take advantage of all the power available to you without creating a bottleneck at the central and most important point, the server. Using a 486/50 EISA as a Net-Ware server, you could have 100 users or more before you would start to see a performance impact. These performance concepts are well known in desktop culture, but they are difficult concepts for a mainframe administrator to grasp.

Performance is a reason that can't be ignored. I've benchmarked the Oracle NetWare Loadable Module (NLM) on NetWare, comparing it to an equivalent Unix machine and even a VAX 6420 running VMS. My tests delivered a higher number of transactions per second on the Oracle NLM than on either of the other platforms. I do recommend dedicating a database server in this instance, because the Oracle NLM does a large portion of its processing on the server.

I performed this benchmark in an effort to determine how much of a performance hit we were going to take by downsizing, and I discovered that we would actually see a benefit. While results may differ if the NLM is pitted against an IBM 3090, I'm convinced that DEC bouses would experience a performance benefit from downsizing.

WHAT MAKES SENSE. However, downsizing is never an either/or situation. Rarely would I go into a VAX-based information systems department or an IBM house and come out six months later having entirely replaced the mainframes with downsized applications running on PC networks. However, it is not unusual to go into a DEC bouse running six or seven VAXes and come out later having reorganized the system into one or two VAXes and a PC network.

In many cases, it makes sense to keep the mainframe and entrenched mainframe applications unchanged. Many companies are running custom, mission-critical applications in which the company has invested a great deal of resources. Sucb applications are more complicated than any of the other applications discussed, largely because the way such an application functions greatly depends on who designed it.

Thus there are some things that just don't make sense to redesign and downsize. The best example is the home-grown application, written in COBOL, for example, doing report generation without creating lots of network activity. Downsize as many of the other applications as possible, and simply include terminal emulation in the platform so that users can gain access to the mainframe in mainframe style.

You may also find a PC-based application that provides much of the same functionality as your bome-grown application. The potential advantage is the lack of redevelopment needed to convert.

Later — say, over a five-year period — you can complete the process by redesigning the more complicated applications that need re-engineering. Eventually, emulation should be eliminated for the sake of overall performance. I see it as a crutch, a less painful way to make the move to a fully distributed solution. However, it is likely that there will be organizations that never make the complete switch. In computing, familiarity breeds comfort, not contempt.

However, a VAX can also function quite well as a back-end database server, and NetWare can provide the connectivity needed to access the database using SQL links. The system can be designed so that users don't even realize that the database they access is running anywhere other than locally.

But if 80 percent of what you are doing is personal productivity, then the move to downsize is a no brainer. It's been proven repeatedly that PC-based productivity applications are far more effective than mainframe-based equivalents.

Thus a good rule of tbumb is to ask yourself whether your mission-critical applications are currently in need of upgrading, and if your upgrade efforts would be more costly and time-consuming than efforts to move the application itself to a different platform. Then look ahead at maintenance costs of about $300,000 a year. You could implement a fairly sophisticated LAN-based system in your office for a one-time start-up cost of about the same and maintenance of $50,000 to $60,000 a year, including hardware and software.

Those numbers alone are excellent incentive, considering most IS budgets are shrinking in the face of the recession. But I think the shrinking budget is also a result of the changing face of computing. Everything about the mainframe culture is monolithic and the expense associated with it is outrageous. In increasing numbers, IS managers are comprehending the notion that PCs can accomplish their goals for a tenth of the cost.

Chris Spence is a senior network engineer specializing in multivendor connectivity for PC Edge, in San Jose, California. His perspective on downsizing is based on more than 10 years' experience as an independent consultant and network manager.

CASE STUDY

Church empowers staff, volunteers, in move to NetWare

Single-vendor mainframe policy is set aside for downsized solution

BY CHARLES DARLING

In the mid-70s, in a small town outside Chicago, three hundred people gathered in a rented theater for the first service of the new Willow Creek Community Church. Today, 15,000 people attend weekend services on WCCC's 127-acre campus in South Barrington, Illinois.

Since its inception, the church has sprouted more than 90 separate ministries addressing the needs of young people, adults, prisoners, the unemployed, the developmentally challenged, and many others. Managing WCCC in the 1990s involves much more than counting the collection and keeping the Sunday school list.

The church's first significant step into the world of computers came in 1984 when its board of directors selected a Hewlett-Packard 260 minicomputer to help with the church's dramatic growth. The choice was hardly surprising: PCs were still in their infancy, and board members that knew anything about computers were versed in minicomputers and mainframes, not the new PCs.

In the dark days before open systems, inter-vendor wrangling torpedoed more than one innovative data processing project, so the board dictated an all-HP solution, making WCCC a single-vendor shop. The 260 ran an HP operating system and supported 10 terminals running accounting and word processing. A volunteer used HP BASIC to write a contribution tracking system.

The single-vendor policy still reigned in 1986 when the board selected a network of HP PCs running HP's network operating system and HP's word processing package. Moving word processing from the minicomputer to the PCs saved precious CPU cycles on the bigger machine, but by the end of the year it was apparent that the 260 was running out of gas. The contribution tracking system desperately needed a rewrite, but volunteers who knew HP BASIC were hard to find and consultants, if they could be found, were too expensive.

The accounting system's month-end processing had slowed to a crawl: it took as much as two days each month to close the books. There was no room for adding important new applications, like order processing, that the growing size and complexity of church operations demanded.

In the mid-80s, when you outgrew a computer, you stepped up — the board's first plan was to bring in an HP 3000, Hewlett-Packard's newer and more powerful mini, to handle better accounting software and a new order processing system that another church had offered to sell to WCCC. The existing contribution system would be rewritten to run on the 3000. In January of 1987, a small HP 3000 arrived.

Almost immediately, a problem cropped up: the other church decided not to sell WCCC the order processing system after all. With no choice but to move ahead, the computer team began to convert the contribution system and to look around for the additional hardware and software they would need. But the road wasn't getting any smoother.

Mike Molsen, director of information services, was a new hire at the time, but he remembered "what a hassle it was to work with the 3000 and how costly it would be" to implement the board's plan. The projected costs of disk space, accounting packages, consultants, and so on were adding up quickly.

STACKING THE DECK. While Molsen's background was mainframes, he knew enough about PCs and had enough respect for their potential to take a look in that direction. Clearly, a networked PC alternative would be less expensive. But equally clearly, the board, with its big-system background, was not likely to buy into a radical change in direction without some careful convincing.

The board's biggest concern was cost, followed closely by their concern for the functionality and integrity of the accounting system. Downsizing to PCs could address those concerns, but the idea would have to be presented carefully. Molsen began laying the groundwork.

Molsen had the accounting department look at demonstrations of PC accounting packages and HP 3000 accounting packages. Everything they saw was better than what they had on the 260, but the PC packages were much less expensive than the 3000 packages. Next, Molsen prepared a budget for upgrading and maintaining the 3000 and a comparable budget for a PC network. Finally, he provided the controller, to whom he reports, with a list of organizations as large or larger than WCCC that were successfully using PC networks for the heart of their day-to-day operations.

For the controller, the decision was made by the bottom line, with PCs the clear winner. He approached members of the board informally, pointing out the obvious cost benefits and suggesting that they try the PC approach for a year or two to see how it worked. Soon the board sent Molsen shopping for his new, downsized solution.

With the move to PCs, a new philosophy replaced the single-vendor bias. In an organization like WCCC that relies heavily on volunteerism, the skills of its volunteers are an important asset. The single-vendor approach did not allow WCCC to maximize its return on its volunteers' increasing use of PCs at home and at work.

Avoiding that mistake on the new system meant "being in the middle of what everyone is doing," said Molsen. He considered Microsoft's LAN Manager, but doubts about its long-term viability in the marketplace pushed him to the more widely accepted Novell NetWare. Molsen built a system around the hardware and software that volunteers were most likely to know already so that the church could get the most out of its computers and its volunteers.

A NOVELL SOLUTION. The church opted for an expandable "super server" approach to the new network by buying an entry-level NetFrame NF 100 80386 33 MHz file server with 16 megabytes of RAM and duplexed 1.6-gigabyte hard drives. To keep up with the church's rapid growth, Molsen recently expanded the system to 32 megabytes of RAM and four 1.6-gigabyte hard drives.

The network supports a large and varied population of workstations. Eighty PCs share an Ethernet backbone. Many are 80286 16 MHz machines with 1 megabyte of RAM and a 40-megabyte hard drive, running DOS. Newer machines are 80386SX 20 MHz systems with 8 megabytes of RAM and 80-megabyte hard drives running Windows. Another 40 workstations are Apple Macintoshes on an AppleTalk network that is linked to the NetWare network through a NetWare Loadable Module (NLM). This NLM allows all the Macs to access and store data on the NetWare hard drives, greatly simplifying vital system management chores such as backup.

The switch to PCs triggered an explosion of computer use at WCCC. Word Perfect became popular because it allow

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ROBB JOHNSON

Dan McFarland, Mike Molsen, Steve Clindaniel and Paul Sorce (left to right) of the Willow Creek Community Church.

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CASE STUDY

Pacific Enterprises downsizes outdated accounting system

Live-in consultant moves out when Novell network moves in

BY CHARLES DARLING

Pacific Enterprises is a $6.5-billion diversified holding company in Los Angeles. Its holdings include Southern California Gas, the company that distributes more natural gas than any other company in the world, and Thrifty Drug Stores, a major retailing chain. In such a full-throttle business climate, speed, accuracy, and flexibility of information are no longer just competitive advantages but necessities for survival. While Pacific Enterprises had grown into a huge operation, the company's accounting department was sputtering along at half speed, held back by inappropriate technology.

The process of getting the accounting department off its remote IBM 9375 running CICS began in late 1989. A consultant was brought in to do a study and to create a detailed plan of action for implementing a new system.

"No one else knew how to do it," recalled Ted Finamore, accounting manager at Pacific Enterprises. "We had to have an in-house consultant, full time, to maintain the old accounting program." The accounting program was "tough to use and inordinately complex and cumbersome," according to Finamore. As well, the system was expensive to run and maintain, and offered poor performance between its frequent failures.

As a result, said Finamore, Users hated using the accounting program. "You've never seen an unhappier bunch of accountants," he said. "They were enthusiastic about a change." Management was inclined to go along with the idea.

At the same time, the company set out to enhance the natural symbiosis between the information systems department and the accounting department by hiring someone with a strong accounting background and significant systems experience. That someone was Finamore.

REQUEST FOR PROPOSAL. After doing a thorough needs analysis, the consultant produced a request for proposal (RFP) that addressed a laundry list of complaints about the old system. The RFP was very detailed, specifying features that would speed up the accounting department's work, enabling them to efficiently process the multibillion-dollar transactions that were handled regularly.

For example, it required that the proposed software be able to create and store distribution templates; such templates would allow users to distribute invoices to all the general ledger accounts that are appropriate for the invoice's vendor, with a minimum number of keystrokes.

The RFP was sent to many major suppliers of general accounting software for Novell NetWare, which was already established as the company-wide networking standard. The department considered proposals for a number of well known accounting packages, but it was On the Money (OTM) from Parker Systems in Carson City, Nevada, that finally won the contract.

The decision was based in large part on Parker Systems' willingness to modify OTM to accommodate Pacific Enterprises's special needs, such as the support of distribution templates. Another important point was the fact that OTM is written entirely in DataFlex, a fourth-generation application development environment from Data Access Corporation in Miami. The flexibility of DataFlex made it cost-effective for Parker Systems to modify OTM to Pacific Enterprises' specifications.

By July of 1990, the modified OTM software had been installed on the accounting department's share of the corporate network: a mirrored 1.2-gigabyte hard disk on a 12-megabyte IBM PS/2 Model 80. The accounting staff was equipped to access the new software from IBM PS/2 Model 70 workstations configured with 4 megabytes of RAM, 120-megabyte hard disks, and math coprocessor chips. The staff runs the Windows versions of Microsoft Word and Microsoft Excel under DOS 5.0 and Windows 3.1.

Ted Finamore, Pacific Enterprises' accounting manager

Just as the OTM installation was easy, converting data from the old accounting software to OTM was no great trick. Data from the old system was dumped into comma-delimited ASCII format, then read into OTM using some simple custom DataFlex programs.

SUBTLE DETAILS. The actual implementation and final debugging of the customized OTM software were another story, however. Finamore pointed out that most of the problems at this stage were caused by details "that only the clerks know about. If you don't do their job on a day-in, day-out basis, you won't know about it and they won't think to tell you" until the new software is delivered, he said.

Communicating these subtle details to the programmers was frustrating at times. "If you put a bookkeeper in a room with a DataFlex programmer, they may not have a whole lot in common," said Finamore. "In the beginning, I heard a lot of, 'Why can't they just understand what I'm talking about?'" Fortunately, Finamore's background allowed him to bridge the two worlds. With patience and persistence all the small wrinkles were smoothed out.

Once the downsizing to NetWare and OTM was complete, Pacific Enterprises could call a halt to the "permanent consultant" syndrome. Finamore estimated that 85 percent of the management's requests for information can be handled by OTM's standard reports, or by one of two major custom reports that Parker Systems added: a report that tracks inter-company account activity, and another that tracks general and administrative costs by cost center.

Finamore had several options for addressing the unusual information requests that fall outside of the 85-percent rule. He is skilled in the use of FlexQL, a general-purpose report writer from Data Access that allows users to extract and format information from DataFlex files. For the really demanding requests, he can rely on support from Don Rice, his counterpart in the IS department.

The two are well-matched for these challenges, explained Finamore. "He's a hard-core programmer from one of those big accounting firms, and I'm an accountant with a little bit of programming in my background. So I write the programs and he debugs them and makes them work."

While the new system has been in place for two years, Finamore still gets appreciative remarks from management about the improvement over the old system. "We've taken the mystery out of the accounting software, and we've put the power on the desktop," Finamore said. "When questions arise — 'how many invoices did we process to this vendor during this period of time?' — we don't need a consultant." Pacific Enterprises management is also aware that the accounting department is not only providing more flexibility, but also producing work of higher quality and turning it around at a faster rate.

Users, too are happy with the new system. In fact, Finamore said, they are probably a little spoiled. "People quickly forget how bad it was on the mainframe. They start looking for more bells and whistles. They say, 'wouldn't it be nice if . . . .'"

The IS department is happy with the change as well. Finamore characterized the Pacific Enterprises IS staff as a flexible, innovative team that is perfectly comfortable with the 4GL paradigm. They provide support for the NetWare networks already used by 300-plus employees of Pacific Enterprises — thus, having accounting join the crowd was a natural and appropriate move.

Finamore cautioned that the move away from the mainframe results in a renewed need for user training.

When you leave the mainframe, he said, "you give up a certain amount of structure and discipline. To set 20 people loose with 120-megabyte hard drives, you really need a very thorough, strong, disciplined training program."

Finamore explained that hard drives accumulate irrelevant and out-of-date data, such as old spreadsheets, and redundant extracts of data from OTM. Finding the correct file can be a demanding and error-prone process for users who don't organize files effectively or erase old files. And backing up the local drives on a regular basis is another area of concern.

TRAINING, TRAINING, TRAINING. Finamore's solution is training. When the network arrived, he encouraged everyone in the department to take a class that introduced them to networking basics. He has sent many people to seminars on Windows, as well as specific application categories such as word processing. "They learned the basics, but then they put the books on the shelves and forgot about it. They need more training in the fundamental computer literacy issues." IS is working on a Windows interactive training program that Finamore hoped will let his people get the training they need in a convenient and cost-effective form.

Finamore had plenty of advice to offer anyone contemplating downsizing. First, invest in a good needs analysis. Consultants are an appropriate way to do this because they aren't tied to a daily production schedule, they are objective, and they can work directly with the people on the front lines.

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IMPLEMENTATION STRATEGIES

Relying on NetWare NLMs

Originally designed to add functionality to NetWare, server-based applications can supplant mainframes

BY BRETT GLASS

Enterprises have long been downsizing by substituting LANs and personal computers for the minicomputers and mainframes of yesteryear. Nonetheless, many organizations continue to keep big iron in the back room to handle certain tasks — most often, the storage and maintenance of mission-critical databases.

This may soon change, however, thanks to a growing crop of applications that replace the hulking giants of yore with software that runs directly on your network server. Thanks to these new products, your network file server can also become a database server, an electronic mail post office, a document manager, a project manager, an electronic bulletin board, or even a network-wide traffic cop that can stop the spread of viruses.

Server-based applications aren't a new idea: every major client-server network operating system has had the ability to run additional programs concurrently with the file server software. In the past, these facilities were used almost exclusively by the network vendors themselves to extend the network operating system with value-added features such as bridges and gateways.

But as servers themselves become faster and more powerful, more third-party developers have opted to tap the surplus computing power of these machines, which, as the hubs of enterprise-wide networks, were ideally positioned to provide services to everyone on the LAN.

Under NetWare 3.x (and, presumably, under 4.x), server-based applications are called NetWare Loadable Modules (NLMs). Like applications in any multitasking environment, NLMs run as independent tasks under NetWare's core operating system, sharing resources with the file server; they can be loaded and unloaded without shutting down the network.

Novell, much more than other vendors, has gone out of its way to encourage the development of server-based applications. It has enlisted Watcom, a prominent compiler vendor, to produce development tools for NetWare, and has even begun selling a stripped-down version of the NetWare operating system, sans file server software. While the notion of a NetWare host that's not a file server may seem odd, it's actually quite popular; it's ideal in situations where a user wants to set up a server whose full power is devoted to a third-party application.

DATABASE BOOM. By far the most common server-based application — and the one that's most likely to threaten the continued existence of mainframes — is the database server. Enterprise managers like the idea of keeping mission-critical databases centralized at a server, and for good reason: like the mainframe, a server-based solution provides for good physical security and allows easy backups.

Databases available as NLMs include Empress RDBMS, Gupta SQLBase, Informix, Microsoft SQL Server, Novell's NetWare SQL, Oracle, Progress 4GL/RDBMS, Quadbase, and Sybase SQL Server. Borland's InterBase isn't currently shipping as an NLM, but the company has announced that an NLM version is under development (Borland's Paradox, which can use centralized files but distributes computing chores among the workstations that access the database, is not expected to appear as an NLM).

Because so many vendors have made database servers available, competition is fierce and product quality continues to improve. As a result, companies have a strong incentive to dump their mainframes and superminis and adopt server-based databases instead.

E-MAIL AND DOCUMENT MANAGEMENT. Any workgroup activity — including group scheduling, electronic mail, and document management — is ripe for implementation as an NLM. Novell's MHS runs as an NLM, and other Novell NLMs interface its MHS messaging system to SNADS, Office Vision, X.400, and SMTP.

For those attempting to establish a "paperless" office, packages such as Mortice Kern Systems' MKS RCS, PC DOCS, and SoftSolutions are all packaged as NLMs. WordPerfect Office, which provides e-mail, calendaring, group scheduling, and document management, also has NLM support. And Lotus Development Corp. and Novell recently announced plans to create an NLM that allows a NetWare server to double as a Notes server.

BACKUP SERVERS. Many companies stick with mainframes because they provide a central data repository that's easy to back up. However, with the advent of automatic network archiving packages — many of which are implemented as NLMs — backups of distributed data are no longer a logistical nightmare. Legato Networker 2.0 and Palindrome's The Network Archivist are available as NLMs, as are products from Performance Technology, Storage Dimensions, Cheyenne Software, Emerald Systems, Gigatrend, and Mountain Computer.

Some mainframe installations are known for their draconian security practices — many of which can be duplicated by NLMs. Novell's STAT and Intel's LanSight, two network analysis tools, allow managers to watch for problems or hanky-panky; both run as NLMs on a NetWare server. And two virus scanners — Intel's LANProtect and Cheyenne Software's InocuLAN — stay resident in your server and probe for virus attacks.

THE DARK SIDE OF NLMS. Unfortunately, there is a dark side to overreliance on NLMs. While most network servers have computing power to spare (the major bottleneck is usually not the processor but the disks and network cards), it is possible for a hard-working NLM to bog down a server. The risk of this happening is especially high because NetWare's multitasking is not preemptive — it has no way to prevent any one NLM from hogging the server's resources.

The odds of a conflict increase as multiple NLMs are added to a single server. What's more, because NLMs normally run in Ring 0, the most privileged level of the 386's four-level protection scheme, they are not isolated from other programs running on the machine.

A buggy NLM can destroy incoming and outgoing data and crash the server. This, together with NetWare's cooperative multitasking, makes NLM programming notoriously tricky.

Every program must yield control to the system often enough to let others do their work, but not so often that performance suffers; programmers with the knack for optimizing programs that run in this sort of environment are hard to come by. And "wild" pointers — programming mistakes that can destroy memory and crash the system — are especially common in C, the language in which virtually all NLMs are written.

A NEW ACRONYM? Fortunately, Novell has taken great pains to educate developers and establish certification programs for NLMs. Novell offers special tools to test NLMs, and for $7,000 — probably less than its labor and equipment costs — will certify an NLM as "Novell-approved."

Novell also holds special courses and conferences that help C programmers get up to speed. And third parties offer additional help: NuMega Corp., for example, offers a utility that allows NLMs to run in Ring 3. This shields the system, at least somewhat, from rogue NLMs. Therefore, while it's probably not a good idea to buy Version 1.0 of an NLM product, most of the NLMs you can buy today are quite stable.

NLMs, originally conceived as ways to add features to NetWare itself, weren't designed to be "mainframe killers." Nonetheless, because the best and most popular NLMs perform the very functions once reserved for mainframes and minis, they may be instrumental in the demise of "big iron."

In short, to downsizing companies everywhere, it may not be long before the letters "NLM" really do stand for "No more lousy mainframes."

Brett Glass is an InfoWorld contributing editor.

Willow Creek

Continued from page S76

the various ministries to tap their volunteers' expertise in this popular program. And electronic mail has provided a major incentive for people to become computer users. The church buildings cover 370,000 square feet on 127 acres, and when people realized that e-mail would let them send a message without having to walk two blocks to deliver it, they became easy e-mail converts, Molsen said.

The accounting department uses the dBASE IV version of SBT Accounting from SBT Corp. in Sausalito, California. To tailor the SBT Accounting software to the church's needs, Molsen turned to SBT specialists, an option previously denied him because HP specialists were too hard to find or too expensive.

> **"Everyone has seen the network as a benefit. The new system is saving time."**
>
> *Mike Molsen*

One SBT specialist provided a point-of-sale add-on that Molsen's team modified heavily to handle the special requirements of the Seeds bookstore (see the accompanying sidebar). Another firm is currently modifying an order processing enhancement to SBT to handle the unique demands of the church's audio tape service.

MEETING SPECIAL NEEDS. Much of the software around the church has been custom written by Molsen's small staff or by volunteers. Molsen tried a number of database packages for developing simple, standalone solutions for individual ministries and settled on Symantec's Q&A as the most appropriate trade-off between power and ease of use. Many of the ministries use volunteers to develop applications, then turn to Molsen's team when a problem arises or an urgent enhancement is needed. Standarizing Q&A on Symantec's Q&A has kept life simple for the volunteer developers at WCCC, and the church's support personnel, Molsen said.

Molsen, his staff, and the IS volunteers have also developed sophisticated custom systems using Microsoft's FoxPro. The contributions system that started on the HP 260 has been re-engineered to take advantage of the network. The building services department relies on a work order management system that tells them what facilities need repair, which rooms to set up for an event, and so on. Another custom solution is an event scheduler that helps the church office manage the ebb and flow of meetings and events on campus.

Molsen enthusiastically assessed WCCC's success with the downsizing project. "Everyone has seen the network as a benefit," he said. And the change has been a success not only with the people who use the system, but with the board of directors as well. "They hadn't seen a lot of productivity out of the early computer systems," he said, "but now they are seeing that the new network is saving people time."

While the transition from a single-vendor minicomputer shop to a heterogeneous NetWare network has had its challenging moments, the change has clearly met the goals of cost efficiency and flexibility. But perhaps even more significantly, the change in direction has maximized WCCC's return on its greatest asset: its people.

Charles Darling is a freelance writer and president of Better Business Solutions, a custom software development firm specializing in SQL and Oracle.

POS at Church

Surprisingly, there are more similarities than differences between running WCCC and running a large commercial venture. WCCC's operations make it part convention center, part retailer, part distributor, part fund-raiser. Two examples illustrate these similarities. Point-of-sale (POS) software, a mainstay in the retail industry, plays an important role at WCCC as well.

The Seeds Resource Center at WCCC is a well-stocked, modern bookstore. To handle customer check-out at peak periods the Resource Center uses an efficient bar-code scanning system, much like a supermarket.

Another part of the Seeds ministry provides "instant" audio tapes of the sermon immediately after the end of the service. The tapes are created on high-speed mass duplication equipment and sent by pneumatic tube to the lobby of the auditorium for purchase by the congregation. The tapes also go into inventory for the Resource Center from which they are sold in the bookstore, individually or in sets, or to more than 1,000 subscribers by mail. The order processing department uses traditional inventory and order processing software, modified for Seeds' special needs, to handle 1,200 or more orders per month for these tapes and other products.

Pacific

Continued from page S78

Setting a realistic implementation schedule is another important consideration. Finamore continued. Pacific Enterprises' implementation of OTM was accomplished in a little more than three months, which Finamore stressed was very aggressive given the resources available and the custom work that was part of the project. "If I had it to do over again, I would take a less aggressive schedule and run the systems in parallel for at least a month," he said.

> **"We've taken the mystery out of the software."**
>
> *Ted Finamore*

Finally, Finamore reiterated the need for training, particularly on the basic computer literacy issues. The extra freedom and flexibility that come with a Novell network and a large local hard drive can be a mixed blessing if the users don't develop the expertise and the discipline to use it responsibly.

Downsizing to NetWare has turned the accounting department at Pacific Enterprises into the full-throttle information center that the company needs. And as Ted Finamore and his team zoom into the PC future, the dust settles on that oh-so-common wreckage at the side of the track: the aged mainframe and its ex-live-in consultant.

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COMDEX/Fall '92

PRODUCT ROUNDUP

Transforming your data

Data conversion programs provide versatile alternatives to writing custom routines

BY PAUL KARON

Data conversion may be one of those thorny topics you never really want to bring up in public. It's frightening to think that in order to make your downsizing plans work, you have to get the data off the old platform and onto the new one with a minimum of reorganization.

It's a topic you'll ultimately tackle when you consider downsizing. "Data conversion is not exactly a high-glamour part of the computer industry," said Mike Hoskins, president of Tools & Techniques Inc., the Austin, Texas, maker of Data Junction, a software conversion tool.

Data migration has always involved painfully moving data from the old application to the new one, he added. "The big challenge in data conversion has been to somehow retrieve that data, reformat it, massage it, and then work your own magic on it. "But the data is not going to magically be ready and properly formatted for the new package," Hoskins explained. "It's going to have to be transformed somehow."

That's where data conversion comes in. Many IS shops are in the process of handling their data conversion needs by hand, writing conversion routines in various programming languages and using the basic tools included in their new database packages.

Although most major database management and other PC application software packages include their own data conversion capabilities, many of the tools offer rudimentary capabilities or are inflexible when it comes to manipulating data in order to prepare it for the target applications.

TOOLS WITH RANGE. But there is an emerging supply of software tools specifically designed to help programmers and users with the task. Depending on the situation and needs, one or more of these tools may simplify the data conversion process. The data transfer tools range from tools with relatively limited functionality — those intended mainly to convert data into a form accessible by Lotus 1-2-3 spreadsheets, for example — to packages that claim to be universal switching centers, capable of reformatting data for any application.

In general, these products offer some level of functionality to manipulate data during the conversion process: rather than making a direct transfer of files from one application to another (if possible), the tools will allow users to selectively transfer data, or run increasingly complex operations on the data, altering it for the new application.

One tool with a wide range of capabilities is Extract, from Evolutionary Technologies Inc., based in Austin, Texas. The product is suited for moving data from application to application within a highly heterogeneous environments, according to Robin Curle, executive vice president of sales and marketing, adding that the product can move data between any available format.

Prompting users with a point and click menu, Extract helps programmers define the format of the data they want to take from tha pre-existing applications. Users can not only take raw data, but they can also massage and manipulate that data as part of the extraction process, Curle said. For example, the user can make selective extracts, average groups of fields, add fields, or test for a specific value. The process is completed when the user tells Extract which application to populate with the old data.

"The system generates in about two minutes all of the programs needed to do that work, in the language appropriate for the computer on which it's going to be running," said Curle. She added that Extract can perform any kind of data conversion routine that can be performed with any handwritten, alpha-numeric programming language, but not symbolic languages, such as COBOL or C.

EVERY FORMAT. "We literally can test against every format — including the very old ones and the very new ones, like object-oriented formats," said Curle. "Our customers tend to be Fortune 2000 organizations, companies that are heterogeneous by nature," said Curle. "Most large organizations tend to spend a lot of money moving data around, and because of those problems are looking to do more with less."

Curle said that Extract cuts the cost of writing and maintaining data conversion programs by 80 to 90 percent — a potentially huge savings, given the high cost of maintaining major computer applications. Extract's price ranges from $200,000 to $300,000.

Like Extract, Tools & Techniques' Data Junction seeks to play the role of universal data conversion utility. "We use a hub-and-spoke architecture," said Hoskins. "Data Junction is the hub, and read/write spokes go out to the applications."

In order to massage data during the conversion process, Data Junction includes its own database-like editing capability with fields and records. "We've built a common user editing program, a meta-format, so you can filter it into Data Junction, which allows an intelligent data conversion, altering the data at the Data Junction hub as you make the transfer," said Hoskins.

Data Junction can convert data between some 80 software applications, as long as the data is in a structured form — rows and columns — from database managers (Microsoft Foxbase, dBASE, Borland Paradox, and others), spreadsheets (Lotus 1-2-3, Microsoft Excel, Borland Quattro, and others) as well as flat files, accounting packages, mail-merge files, and other applications. Single-user DOS versions range in cost from $99 to $299; LAN and Unix licenses start at $499 for one to four users. Runtime and OEM licenses are also available.

FOCUS ON 1-2-3. Another data conversion utility, 1-2-3Connection from Stingray Corp. of Franklin, Massachusetts, is designed to increase the user's ability to move data between several PC DBMSs and Lotus 1-2-3 spreadsheets — traditionally, one of the most widely used PC applications. According to Mickey Mirchandani, product manager, for 123Connection, 1-2-3 still has only rudimentary support for import/export, and will bring in whole spreadsheets without doing anything special to the data. "Programmers who need to move data from other applications sometimes find themselves stuck," Mirchandani said.

123Connection is a set of application programming interfaces (APIs) that gives the user more control over rows and records, enabling 1-2-3 users to more effectively use data that did not originally reside in Lotus spreadsheets. The product supports several PC packages, including, Clipper, Clarion 2.0, FoxPro 2.0, TopSpeed, Watcom, Borland C, Microsoft C, and others.

The utility dbLoader, from Software Interfaces Inc. of Houston, Texas is targeted at those who need to perform data conversion to and from a few SQL databases, such as Oracle, Ingres, Sybase, and Rdb/VMS. It also converts delimited fields and other flat file formats.

Most dbLoader users are transferring information to Lotus 1-2-3, or to a statistical package, according to Robert Mills, software engineer at Software Interfaces. "Another set of users," he added "wants to pull data from one of these smaller sources into bigger tools, like Oracle, or to transfer data from one big database to another," Mills said. Depending on the platform, dbLoader ranges in cost from $2,000 to $55,000, although the vast majority of sites can be outfitted for less than $12,000, according to Software Interfaces.

DBMS/Copy Plus 3.1, from SPSS Inc. of Chicago, Illinois provides a route to translate data between more than 60 different software formats. Like the other data translation utilities, DBMS/Copy enables users to manipulate the data under scrutiny, through the use of logical statements or by the creation of new variables. The package is designed for use by corporate MIS programmers developing large applications, as well as end users, who frequently work within a wide variety of applications, moving data from one application to another, according to Day. DBMS/Copy costs $295.

JUST PARADOX. While most makers of data conversion utilities pride themselves on the universality of their products, Conduit 1.1, from Kallista Inc. of Chicago, is designed with Borland's Paradox in mind. Conduit takes the place of and expands upon Flimport, the utility Borland bundled with Paradox to import data into the popular database manager.

Conduit is designed to bring corporate data from mainframes and minicomputers into Paradox 3.5 and 4.0 tables. Conduit also provides customizable controls for analyzing, manipulating, and reporting imported data. It imports or exports ASCII files, including variable or fixed length records, in delimited or undelimited formats, as well as a number of other data formats. Single-user versions of Conduit sell for $239, and five-user NetPacks cost $800. Runtime licenses are available for a one-time fee of $300.

Data transfer utilities can meet many, if not all data conversion needs that will arise in the industry's fast-moving push toward greater networked and downsized computing systems. Combined with the widespread acceptance of the front-end applications they work with, the data conversion utilities available today provide a simple and much needed ready-made data conversion solution for both corporate programmers and end users. Thus the decision to downsize may become easier for everyone involved.

Paul Karon is a freelance writer based in Los Angeles.

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Hardware Compatibility	✓	✓	✓	✓	✓	✓
Reliability	?	✓	✓	✓	✓	✓
Ease of Use	✓	✓	✓	?	✓	✓
Memory Management Flexibility	✓	✓	✓	✓	✓	✓
Quality of Documentation	✓	✓	✓	✓	✓	✓

✓ GOOD ✓ SATISFACTORY ? NEEDS IMPROVEMENT

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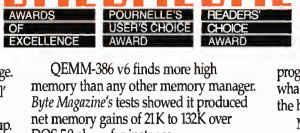

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Key to comparison table: Software compatibility is defined as the product's ability to run without problems with the operating systems PC Week Labs used in testing, MS-DOS 5.0, IBM PC DOS 5.0 and Microsoft Windows 3.0, and with a variety of application software, including Quarterdeck's DESQview 2.41, Xerox Ventura Publisher 3.0 for DOS, WordPerfect 5.1 and Artsoft's LANtastic 4.0. Hardware compatibility is defined as the programs' ability to run on PC Week Lab's test hardware platform, which included a 33MHz 486-based PC 2nd a 25MHz 386-based IBM PS/2 Model 70. Reliability ratings are based on the successful and dependable performance of each operating system and application software package under each memory manager. Ease of use is based on ease of installing and configuring each program, based on support for automatic loading features and the intuitive nature of the interface. Flexibility in managing memory is rated on the range and quality of the product's features in optimizing system performance and handling special-case installation. Quality of documentation is judged by the clarity, comprehensiveness and helpfulness of the documentation provided with the product, based on the organization of the manuals as well as the thoroughness of definitions, directions and explanations, and the inclusion of troubleshooting information.

RICHARD SALA

What we have here is a failure to communicate

Interoperability among dissimilar E-mail products via an X.400 Backbone

WRITTEN AND EDITED BY
NICHOLAS PETRELEY

TESTED BY **JOHN ARRIOLA**
REVIEW BOARD, AND **NICHOLAS PETRELEY, JOANNA TSANG,**
AND **LAURA WONNACOTT**

A typical enterprise is rarely designed and built from the ground up; it is usually a patchwork quilt comprising pieces of diverse hardware and software. When it comes to electronic mail, patching together a fully integrated enterprise from separately designed pieces can be particularly troublesome. One department's LAN may have users communicating with WordPerfect Office for DOS. Another department may communicate using Da Vinci eMail. Still another may be built around a Mac network that uses QuickMail. Then two companies merge, and the new division uses Lotus cc:Mail.

Just how interoperable are dissimilar E-mail products when exchanging messages through a common backbone? If you send an urgent message from one mail product, will it show up as urgent if the recipient is using another product? Will you get a return receipt when the recipient reads the message? Will all the file attachments arrive intact? To find out, we connected six E-mail packages via an X.400 server (a standard messaging system). We also looked at setup, maintenance, and reliability for each product and its gateway.

The six packages tested were all PC products, including BeyondMail 1.10, ccMail 1.10 (mail engine 1.37), Da Vinci eMail 2.01a, Futurus Team 2.02c, Microsoft Mail for PC Networks 3.0, and WordPerfect Mail for Windows 3.1 (part of WordPerfect Office). Our choice of X.400 as the backbone (a common message transfer agent [MTA] with which all our products could exchange messages) was determined by reader survey. We used the Retix Open Server 400 for DOS, Version 1.31 (an X.400 server) as a backbone for integrating all six E-mail products. In our configuration, each product sent messages through an X.400 gateway to the X.400 server, which passed the message on via another X.400 gateway. Both the MHS X.400 gateway, Version 1.5 and ccMail X.400 gateway, Version 1.12 were Retix products. We used WordPerfect's own X.400 Gateway, Version 2.0. We also used Microsoft's X.400 Gateway, Version 3.0.

No path in the matrix of interconnections proved flawless, though some worked better than others. The overall results were rather grim — ranging from a few features dropping out to a message transfer bringing down one or more gateways altogether, requiring manual cleanup and restart. By the time we were done, we were able to locate many of the weak links in the chain, but our compatibility matrices document a widespread lack of interoperability without always indicating where or why a feature or file failed to make it to its destination.

Keep in mind that X.400 is a specification, not a product, and that it is not a single specification. Products can be 1984 or 1988 X.400 compliant, and a 1992 specification is also in the works. The Retix Open Server 400 is an implementation of the 1984 X.400 specification and is one of the most affordable X.400 solutions. It is one of the only DOS-based backbones (they also make an OS/2 and SCO Unix version). Isoplex 400 for DOS by Isocor, a Los Angeles company, is another. It is a competitively priced X.400 open server released earlier this spring. Like the Retix product, the Isoplex 400 conforms to the 1984 specification. Isocor also offers an alternative MHS X.400 gateway, but no other gateways for our configuration.

You can, of course, establish and enforce a single corporate choice of E-mail system. That strategy yields the most cohesive corporate solution and,

See COMMUNICATE, page 100

This in-depth discussion on setting up a mission-critical system is a new approach to product analysis for us. We'd like your input. How useful was the information in this article to you? Did we present it in a manner that was clear and easy to read? We'd like to know. Send your E-mail responses to Nicholas Petreley at MCI Mail address 527-1353, or Nicholas_Petreley@infoworld.com on the Internet. You can find other instructions for submitting your comments in "How to contact *InfoWorld*" on page 60.

Executive summary

If your organization depends on a high level of reliability and seamless interoperability between mail users, then the best route may be to standardize on a single E-mail product or invest in one of the more expensive but robust systems such as AlisaMail, Soft-Switch EMX, or WorldTalk 400. The Retix Open Server 400 backbone with various gateways has promise, but it is not yet the best way to go. It needs the advantages of the 1988 X.400 specification (current support is for the 1984 specification), such as improved file attachment handling and more stable gateways.

E-mail messages commonly include attached files, but even the best linkages through the Retix backbone had problems with file attachments. In only one case were the names of file attachments included, and even then none of the products could associate the names with the files as they would in a local message transfer. The content of text files was unexpectedly modified in some cases, simply because the original file had a TXT file exten-

See EXECUTIVE SUMMARY, page 99

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Battery Life†	2-4 Hours	3.8-7.5 Hours	4-10 Hours
Weight	7.6 Lbs. with Battery	6.5 Lbs. with Battery	5.9 Lbs. with Battery
Warranty	3 Years (International)	3 Years (International)	1 Year (international)
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BeyondMail
Version 1.10

We used BeyondMail, Version 1.10 for DOS with the Retix MHS X.400 gateway, Version 1.5; Message Handling Service (MHS), Version 1.5N; and the Retix OpenServer 400 for DOS, Version 1.31 as the backbone.

SETUP:
BeyondMail uses MHS as the message transfer agent and uses the MHS option to add the BeyondMail application ID to the MHS routing table. When you do this, a "BMail" extension is automatically tacked onto the surname in an X.400 address (jsmith becomes jsmith.bmail, for example). Normally, a message is routed to a generic MHS user name, where any MHS product logged in as that user can pick it up. Adding Beyond to the routing table is a simple operation in MHS.

BeyondMail provides a simple data entry form for adding X.400 alias addresses to your user directory. The gateway rejected these addresses, however, because the Beyond form added a space between the end of the address and the enclosing end bracket. We manually deleted all the extraneous spaces, after which BeyondMail worked fine.

MAINTENANCE:
Maintaining the user directory is a simple but, like most of the products, tedious manual process. Each time you need to add, delete, or change a user, you need to go into the address book and make your changes. Changes at the gateway are made by simply starting up the gateway in configuration mode and filling out a few configuration forms.

RELIABILITY:
The Retix MHS X.400 gateway turned out to be the least stable of the group. We couldn't run our six file attachment stress test through the MHS X.400 gateway because the Ingate program repeatedly choked. Our single-file attachment test made it through with no problems, however. Retix technical support confirmed that the program Ingate has memory problems that can cause it to abort during message transfers.

Recovering transmission failures was often difficult. Most of the time we had to delete messages from queues manually. In some cases we had to completely reinstall MHS and the gateway in order to get running again. Retix says that they are using a different compiler and memory manager and that the new version shipping near year end will use extended or expanded memory.

INTEROPERABILITY:
Although none of the three MHS-based products did particularly well at interoperability, BeyondMail performed the best of the three. BeyondMail was the only one to receive multiple addresses in the To list, though it was only a partial list of two original recipients, and then only when receiving messages from cc:Mail. BeyondMail could reply to both users. BeyondMail consistently displayed the correct priority of a message, except when the message originated from Microsoft Mail.

As with the rest of the MHS-based products, BeyondMail handled receiving file attachments the poorest when the message originated from another MHS product (including another BeyondMail user). This is due to a problem with the Retix MHS X.400 gateway.

Beyond (like the other MHS products) received the six file attachments as separate messages. Each message generated its own return receipt. When the originator was Microsoft Mail, there were actually seven messages altogether at the MHS end — one extra message containing the file names for the attachments. When we sent only one small file attachment, MHS and the MHS gateway handled it well, although the message and attachment were still split into two incoming messages.

When the message originated from Microsoft Mail or WordPerfect Mail, all the MHS products received the attached text file with spurious line feeds inserted in various unpredictable places. This only happened when the text file sent from Microsoft Mail or WordPerfect Mail had a file extension of TXT. Apparently, these two products identify any file with a TXT extension as an IA5 file (an X.400 convention for identifying ASCII text files; the format includes most of the 127 characters). Having recognized it as an IA5 file, the MHS gateway could be attempting to improperly massage the data in the file. When the file extension is something other than TXT, the file is probably branded as a binary file and passed directly through unaltered. Retix, the vendor for the MHS X.400 gateway, said an in-line update, Version 1.51B2, may have corrected this problem.

INTEROPERABILITY TESTS

BeyondMail

INFO WORLD

	cc:Mail	Da Vinci eMail	BeyondMail	Futurus Team	Microsoft Mail	WordPerfect Mail
Subject	Corrupt	Truncated	Corrupt	Corrupt	Corrupt	Corrupt
Six file attachments > 1MB	No[1]	No[1]	No[1]	No[1]	No[1]	No[1]
One file attachment 50K	Yes	Yes	Yes	Yes	Yes	Yes
File attachment names	None	None	None	None	None	None
Total IDs in TO list	1	1	1	1	1	1
CC:	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
Originator's address	Accurate	Accurate	Accurate	Accurate	Accurate	Accurate
Address representation	Unfriendly	Unfriendly	Unfriendly	Unfriendly	Unfriendly	Unfriendly
Reply to originator	Yes	Yes	Yes	Yes	Yes	Yes
Reply to all original	No	No	No	No	No	N/A
Reply to reply	Yes	Yes	Yes	Yes	Yes	Yes
Return receipt	Yes	Yes	Yes	No	Yes	Yes
Correct priority	No	No	Yes	Yes	No	Yes
Word wrap correct	No	No	No	No	No	No

[1]MHS gateway failed repeatedly during six-file transfer.

Directory Synchronization and Global Directory Services

When you integrate dissimilar E-mail products within an organization using an X.400 backbone, addressing is almost entirely an internal matter. Once you have the X.400 alias addresses for your corporate users added to the directories for all the E-mail products in use, all you have to worry about is keeping the lists current. When an address for a single user changes, you have to update all the directories across all dissimilar E-mail products. Such a process is called directory synchronization.

The need for directory synchronization is not limited to sites where multiple E-mail systems are integrated. But although many individual E-mail systems already provide a directory synchronization function that will keep all post office directories for that specific product updated, none of them synchronize other vendors' directories. To address this issue, a group of leading vendors got together to develop a standard model for transferring, storing, and distributing address changes throughout a messaging network of any size. This jointly developed solution is called Directory Exchange (DX).

The concept behind DX is to use the existing messaging backbone to move the directory change information from one site to another. The path for a directory update is similar to an E-mail message from one vendor's product to another. One DX-enabled gateway converts the local proprietary directory update information into an X.400 message, and a second gateway converts the message back to a format the target directory can use. A Directory Exchange Server is the repository for all the replicated directories in the system and is responsible for propagation of the address information to the targeted E-mail directories via the DX-enabled gateways.

Directory synchronization is not limited to sites with integrated E-mail systems.

Although the Directory Exchange approach may help solve internal directory synchronization across dissimilar E-mail engines, the problem of accessing a current address for a user outside your organization is entirely a different matter. An X.400 address consists of at least a country, administrative domain, private domain, organization, and some other field (surname, domain-defined attribute, etc.) to specify the actual user who will get the mail. There is nothing intuitive about constructing such an address — you either know the specific data for the X.400 fields, or you don't. Currently, about the only way to get it is the hard way: Call the recipient on the phone and ask.

Enter X.500. X.500 is the CCITT recommendation for a global directory architecture for the Open Systems Interconnection (OSI) model designed to work with X.400 messaging. X.500 is a specification designed to lead to the ability to look up anyone's address, just as you might find a phone number in the white or yellow pages of a phone book. Ideally, you should be able to search for Mel Kizidek working at Universal Accounting Corp., and the X.500 directory should return the proper E-mail address to get your message through.

To accomplish the goal of making E-mail navigation simple and universal, X.500 directory service needs to be logically centralized (appear to end-users as one large repository of information), but physically distributed across all the systems that access the directory. To work properly, X.500 will have to be

cc:Mail
Version 1.10

We used cc:Mail for Windows, Client Version 1.10, Mail Engine Version 1.37, with the Retix cc:Mail X.400 gateway, Version 1.12.

SETUP:
The cc:Mail gateway was reasonably easy to set up. We used a single gateway installation to route messages to and from X.400 using two different cc:Mail post offices. We did this by setting up the gateway to run from a looping batch file using different configuration files one after another. The gateway checks one post office, times out, checks the next post office, and so on until the batch file loops back to the beginning.

cc:Mail gateway addresses are set up through the cc:Mail administration program. As with most of the products we tested, it was tedious. Each complete X.400 alias had to be typed separately.

MAINTENANCE:
There were no special maintenance problems with the cc:Mail installation. Like the MHS gateway, you configure it by starting it up in configuration mode and changing the data in the forms.

RELIABILITY:
Along with Microsoft's product, the cc:Mail gateway gave us the least trouble. Once up and running, it ran reliably through our entire testing phase.

INTEROPERABILITY:
cc:Mail was second to Microsoft Mail in receiving the complete list of original recipients. cc:Mail couldn't reply correctly to the entire list. This is because cc:Mail usually placed the surname or domain defined attribute value in the list and disregarded the rest of the X.400 address. In its favor, we did get an X.400 transmission report when our replies did not go through.

cc:Mail was the only product to send all six file attachments intact. Sadly, no file names were sent along with the files. Although other products received our large text file corrupted when Microsoft Mail sent our six-attachment message, cc:Mail was the only one to receive the file attachment with all the lines truncated to 80 characters. As with the MHS products, the cc:Mail gateway recognized the 1A5 X.400 identification — only this time the gateway attempted to wrap the text into a more readable format. Unfortunately, our test file was meant to be a comma-delimited database file, which is made unusable by the added carriage returns.

When the message originated from cc:Mail — unlike the other packages — all but WordPerfect listed the carbon copy recipient. When a cc:Mail user was both the originator and a recipient, the carbon-copied user flashed a message that a receipt was being returned, but no receipt showed up at the originator's inbox. Also, when the recipient of a blind carbon copy was a product other than cc:Mail, it too failed to return a receipt.

INTEROPERABILITY TESTS — INFO WORLD

cc:Mail

	cc:Mail	Da Vinci eMail	BeyondMail	Futurus Team	Microsoft Mail	WordPerfect Mail
Subject	Corrupt	Truncated	Corrupt	Corrupt	Corrupt	Corrupt
Six file attachments > 1MB	Yes	Yes	Yes	Yes	Yes	Yes
One file attachment 50K	Yes	Yes	Yes	Yes	Yes	Yes
File attachment names	None	None	None	None	None	None
Total IDs in TO list	6	1	2	1	6	1
CC:	Listed	Listed	Listed	Listed	Listed	Not listed
Originator's address	Accurate	Accurate	Accurate	Accurate	Accurate	Accurate
Address representation	Unfriendly	Friendly	Unfriendly	Unfriendly	Friendly	Unfriendly
Reply to originator	Yes	Yes	Yes	Yes	Yes	Yes
Reply to all original	No	No	No[1]	No	Yes	N/A
Reply to reply	Yes	Yes	Yes	Yes	Yes	Yes
Return receipt	Yes	Yes	Yes	No[2]	Yes	Yes
Correct priority	Yes	No	Yes	Yes	No	Yes
Word wrap correct	No	No	Yes	Yes	No	Yes

[1]Beyond could only reply to the partial list of two original recipients.
[2]Futurus received endless nondelivery reports after reading the message.

Continued from previous page

implemented as a distributed real-time directory service that transcends hardware and operating system platforms.

Turning this ambitious concept into a reality obviously carries with it substantial problems. Even on a corporate scale, the actual implementation would be large and complex. Companies with thousands of E-mail users scattered over hundreds of offices would require a widely distributed database of addresses, possibly residing on disparate hardware running under different operating systems.

Besides the issues of systems integration and data security, there will still be a need for directory synchronization. Directories for any given organization will doubtlessly coexist in several places in order to be readily and reliably accessible in real time. Because users' addresses will be modified on a continual basis, there must be an automatic means of frequently updating directory information everywhere it exists.

The implications of implementing an X.500 strategy on a global scale (a distributed database of international E-mail addresses, for example) are staggering. A full implementation of X.500 properly actualized on a global scale (if such a thing is possible) will be two things at least — big, and expensive.

— Nicholas Petreley and James Neiser, Associate Vice President, OSI Business Unit, Retix.

EXECUTIVE SUMMARY / from page 85
Interoperability among six E-mail products

sion. Some gateways are fragile, aborting or behaving erratically when put under stress or when X.400 addresses weren't perfect.

Every package could exchange simple messages with all the others, but some features were always lost en route. Almost no one received the full list of original recipients with a message. Getting the right priority on a message was erratic. It is impossible to synchronize directories across all these mail packages without physically updating their user lists one at a time. Until some type of directory exchange support matures, maintaining user directories could be a full-time job.

Microsoft Mail takes the undisputed lead at interoperability, friendliness, and directory synchronization across Microsoft Mail post offices. When the originator was not an MHS product, addresses were always represented in a friendly manner (a user name without the entire X.400 address), and Microsoft Mail could return messages to all original recipients. Microsoft Mail was the only product to send file names along with the attachments, although the names could not be associated with the files directly (a limitation of the 1984 X.400 specification supported by the Retix OpenServer). You can work around text file attachment problems by changing a Microsoft Mail gateway configuration file — the only gateway with that kind of flexibility. On the downside, Microsoft Mail was unable to communicate the high priority of a message to any other product.

Microsoft Mail takes the undisputed lead at interoperability.

cc:Mail was the only product to send successfully all six file attachments to their destination regardless of the attachment file names. cc:Mail got the priority to four of the six recipients. The cc:Mail gateway didn't always interpret incoming text file attachments properly, but it was among the most reliable of gateways — it never required maintenance or manual cleaning of mail queues. Though cc:Mail sometimes received a full list of original recipients, we were never able to reply to all of the users in the list.

WordPerfect Mail for Windows had an odd relationship with Microsoft Mail. It did almost as well as Microsoft at file transfers, but some or all of the file attachments were lost when sending to Microsoft Mail and another WordPerfect user. WordPerfect Mail always received the priority correctly, except when Microsoft Mail sent the message. It also returned receipt to everyone except Microsoft Mail and WordPerfect. The WordPerfect gateway was by far the most trouble to understand, set up, and maintain.

Being tied into the same mail engine, the three MHS-based products all exhibited about the same behavior but with a few differences. None of them could pass all six file attachments to another MHS product, due to problems with the Retix MHS X.400 gateway, but the files did arrive at other destinations safely.

BeyondMail had some advantages over the other two MHS products. Once, it received more than one person in the From list, so that it could reply to at least two of the original recipients. It received the correct message priority most of the time.

Da Vinci eMail ranks just below BeyondMail. It never saw the priority of a message correctly, and it always truncated incoming Subjects because of its shorter Subject field. On the up side, Da Vinci sometimes displayed the originator's ID (the From field) in both a friendly and accurate manner, and it usually did so without any special configuration.

Futurus Team has a few distinctions. Futurus has no software-assisted means of entering and maintaining remote X.400 addresses (you must edit text files with your own editor), but we actually preferred that. Using a known editor can require a lot fewer keystrokes than navigating through an address book. Like BeyondMail, Futurus Team often received the priority of a message correctly. We had a problem replying to replies from users with X.400 addresses longer than 80 characters, namely WordPerfect Mail.

Getting six E-mail systems to talk through a common backbone

HOW WE TEST — E-MAIL GATEWAYS

We connected six electronic mail products: BeyondMail, cc:Mail, Da Vinci eMail, Futurus Team, Microsoft Mail, and WordPerfect Mail. Our reader survey showed the greatest interest in X.400 as the method for integrating E-mail. Our solution was to use a Retix Open Server 400 for DOS as a backbone and interconnect each E-mail system through an X.400 gateway. There are larger, more powerful and, of course, much more expensive solutions that promise better interoperability. These systems run on minis and mainframes (such as the X.400 backbones provided by Worldtalk and Soft-Switch and the non-X.400 solution provided by Alisa Systems).

There are various other means of interconnecting E-mail products. One is the vendor-to-vendor gateway. This is a tenable method if you only need to connect two E-mail systems. If one department is using an Message Handling Service (MHS)-based E-mail package such as BeyondMail, and another is using Lotus cc:Mail, you can buy a single gateway that connects the two. As the number of E-mail packages in the enterprise increases, however, the vendor-to-vendor solution becomes a tangled web of multiple gateways. In this scenario, every product needs a separate gateway to talk to every other product. Three products with different E-mail engines would need three gateways; four dissimilar products would need a total of six gateways for full integration, and so on.

In theory, the X.400 backbone approach reduces the number of gateways to the number of E-mail products connected. In practice, it's better than that. Because three of our test products (BeyondMail, Da Vinci, and Futurus) all use MHS as their mail engine, only one MHS gateway was needed to connect these products to the X.400 backbone. Therefore, a total of four gateways were used to connect all six products, as opposed to a minimum of six required for a vendor-to-vendor solution.

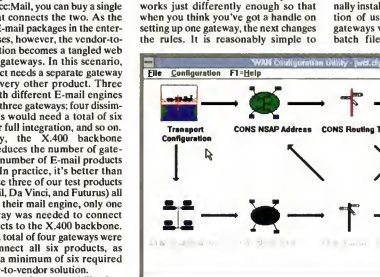
One look at our interoperability feature matrix will doubtlessly raise the question of why we sent messages through an X.400 server only to return to a user of a like product (cc:Mail through X.400 to cc:Mail, for example). This is especially puzzling when testing multiple products supporting MHS that don't require gateways to interoperate. If our tests were simulating only the integration of E-mail products within a local environment, of course such tests wouldn't make sense. In a global environment, however, where the Retix Open Server 400 is not only a local integrating backbone but the link to the outside world as well, MHS messages may very well be routed through X.400 and back to a remote MHS user again.

In spite of our mixed results, the choice of X.400 itself is not without merit, depending on how much you're willing to spend, your ultimate goal, and how long you are willing to wait to achieve it. The latest X.400 specification provides more than enough power for seamless messaging between E-mail packages, even if the full capabilities are rarely used by all gateways and E-mail products. In addition, X.400 is supported by the AT&T and MCI value-added networking services. An enterprise E-mail solution based on an X.400 backbone should have ready access to the outside world.

SETUP:

We used the Retix Open Server 400 for DOS, Version 1.31, Revision C as the core, or backbone, of our system. The setup program was a Windows 3.0 application called OCU (Open Server Configuration Utility — it won't work under Windows 3.1). We also used the WAN Configuration Utility (WCU), which configures a WAN link, namely the X.25 communications link used to connect the Open Server to Microsoft Mail.

Setting up the entire system was a long and arduous process. Each product works just differently enough so that when you think you've got a handle on setting up one gateway, the next changes the rules. It is reasonably simple to install and set up the server initially if you know something about E-mail, message transfer agents (MTAs), queues, and gateways — substantially more difficult if you don't.



The Retix OpenServer 400 for DOS has a set of easy-to-use Windows 3.0-based configuration utilities.

First we set up the Retix MTA within the Open Server. We defined the central Retix MTA in the OCU and edited a few text files. When we were finished, a Retix X.400 MTA icon appeared on the Windows OCU display. Then we set up the gateways that would talk to the Retix MTA. For all products except Microsoft, that was just a matter of defining an X.400 address for a gateway and a routing trace path (in our case, it was usually the same as the X.400 address). The OCU makes this a relatively simple process. Retix creates an icon for the gateway, which is linked to the central Retix MTA. The OCU then drew a line between the Retix MTA icon and the gateway icon, showing the existing link.

In the case of Microsoft, we set up another MTA icon and linked it to the Retix MTA. This was a more difficult process; there are several parameters to set to make the X.25 connection work properly, and the process will not be obvious to anyone except an experienced X.25 user. Jumpers on the X.25 cards may need to be configured, and various software parameters must be set at several locations. We first used the Eicon X.25 cards, so we needed to run the configuration program and enter all the correct information. Then we had to edit the CONFIG.SYS file at the Retix Open Server machine to install a special device driver. Each time we rebooted that machine, an X.25 configuration file had to be reloaded. Finally, we had to enter all the correct parameters in the Retix Windows OCU and WCU programs.

Since we didn't break the shrink-wrap on Microsoft's product until all the other gateways were working, we hadn't counted on having to simulate a remote connection. The Open Server was originally installed, therefore, with the intention of using it only to connect local gateways via Ethernet. As a result, the batch file that launched our Open Server contained a command-line switch that told the server never to start up the Reliable Transport Service which allows the server to communicate via the X.25 card. This switch had no effect on the other gateways, but it kept the server from starting the only service that would allow it to communicate with Microsoft's product.

The X.25 connection gave us a lot of trouble in addition to this unfortunate oversight. This was primarily because our X.25 connection was to a local, rather than remote, system. It's one thing to connect an X.25 card to a modem; it's quite another to use X.25 cards to connect two machines on the same rack. X.25 is not normally used to connect local PCs, but it's the only way to connect Microsoft Mail Gateway to a Retix Open Server. The current version of Microsoft Mail Gateway doesn't support an Ethernet connection to the Open Server, so be prepared to tackle the difficulties of a local connection if you want to integrate Microsoft Mail via a Retix X.400 backbone.

We first tried to connect the machines with a null-modem cable and two Eicon X.25 cards, one on each end. Each card required defining detailed configuration settings. In no time we found it takes X.25 experience to understand the manual, let alone choose the right settings for the cards. The Eicon card requires a special driver on the Retix Open Server end, and that has to be configured properly, as well.

Having failed with Eicon thus far (unknowingly, because of the faulty command-line switch at the Open Server), we substituted a Retix X.25 card for the Eicon card on the Open Server and hoped for better results. This proved even more complicated. The Retix X.25 card relies on the modem's clock for proper communication, and we weren't using a modem. The Retix card would have to be configured carefully to use the Eicon card's clock, or a modem eliminator could be used to supply the clock for both ends. We opted for a modem eliminator, under the advice of a Retix technician.

Even with all the right equipment in place, there was still no communication between the Microsoft Mail system and the Retix Open Server. Then we discovered the erroneous command-line switch setting. As it turns out, it's likely the two Eicon cards would have worked without difficulty had we discovered the setting earlier.

Each gateway (the MHS, cc:Mail, and WordPerfect Office gateways and Microsoft Mail MTA) must be installed and configured. We had to define parameters corresponding to those set at the Retix end. In each gateway, we defined the path to the input and output queues used by Retix. Microsoft Mail did not require this, because its connection was made via X.25.

After the gateways are all in place, we had to edit each product's E-mail address book. You could simply define a gateway address and type the X.400 addresses manually each time you send a message, but most administrators will want to make messaging as transparent as possible for the end-user. We created X.400 aliases for all our users.

We discovered some quirks about MHS that caused numerous setup headaches. There is an undocumented limitation of MHS that prevents it from working properly if you have more than 12 drive mappings active at once. This had us chasing our tails for days, because the symptoms were so bizarre. MHS would load but refuse to start up the directory manager or utilities. It unassigned our drive J mapping. Even more confusing was the fact that a new installation of MHS would work fine after the installation but fail after logging in a second time. These problems are known to Novell and will be documented in a future release, according to the vendor.

MAINTENANCE:

We examined how easy it was to update the address books. In all cases, it was a manual process. There was no facility for updating an X.400 address in one E-mail package and propagating that change to the other packages.

See HOW WE TEST, page 101

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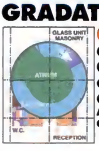

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SQL Server-based AlisaMail transcends X.400 standard to provide simple, reliable cross-platform addressing and other server-based applications and services

Though the term "backbone" conjures up visions of strength and foundation, our lab tests demonstrate that the X.400 backbone is often plagued with problems when used to integrate dissimilar E-mail systems. Clearly, the idea that a defined standard or specification should be the cornerstone to bridging a wide variety of dissimilar E-mail packages is suspect.

Alisa Systems' AlisaMail is a unique solution to the E-mail integration puzzle. AlisaMail is a single-vendor product revolving around a Sybase SQL Server running on a DEC VAX. Messaging is a form of information that needs to be managed, thus the choice of a database platform to integrate E-mail systems is a logical alternative.

The folks at Alisa understand that if you create and construct based on a standard like X.400, you'll always be limited by what that standard defines. Also, not only do standard-based products usually have to play catch-up to innovative ideas and products, standards are also often misinterpreted, leading to the recognition that fully functional integration may never be achieved.

How does Alisa's database approach differ from the backbone approach? Both eliminate the proliferation of gateways. The backbone approach does so by providing transport protocols and store-and-forward facilities, and the database approach by providing central services speaking the native language of each E-mail system. A SQL database approach makes directory access and maintenance a breeze. The major drawback of the X.400 backbone approach is that, without a fully developed X.500 implementation, it fails to confront the problem of addressing. Directory management using only an X.400 backbone is a difficult and time-consuming chore.

A database approach permits better management of message addressing. All the X.400 attributes for each E-mail user can be stored in the SQL Server database.

AlisaMail 4.0 supports the following E-mail systems and protocols: Lotus Development's ccMail; Da Vinci eMail; Novell's MHS; Microsoft Mail on the PC and Mac; CE Software's QuickMail; and DEC's VMSmail, All-in-1, and Message Router, which supports many industry-standard messaging protocols (X.400, Profs, SNADS, and UMC). If this list contains all your E-mail systems and, more importantly, you have or are willing to acquire a DEC VAX 3000 series or later running VMS, Version 5.4 with a minimum of 78,000 free blocks and 12 megabytes of free RAM, read on.

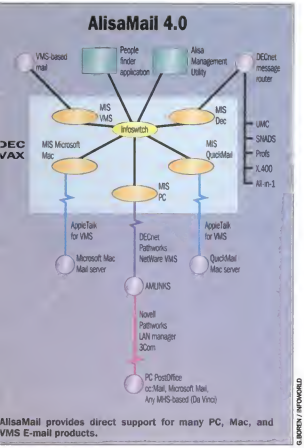
The Alisa approach uses the distributed relational database architecture capabilities of Sybase's SQL Server. Alisa's database platform supports a series of applications and services centered on the SQL-based messaging engine called the Information Switch, which coordinates all E-mail integration. The Information Switch not only handles the transfer of messages between E-mail systems, but also provides a central repository for messages and a database directory of E-mail users.

A database approach permits better management of message addressing. All the X.400 attributes for each E-mail user can be stored in the SQL Server database. The X.400 address appears and is transported as a structured piece of data, not merely a representation of a character string address.

In addition, the client/server application called PeopleFinder provides a comprehensive directory search and retrieval of the AlisaMail directory. PeopleFinder grants access to a universal directory that can store information on more than 100,000 E-mail users. It's a breeze to use. You simply enter specific fields to search by (name, title, organization, or location). You may even query the database on partial or sounds-like information. Complicated addressing schemes and aliases are eliminated. Once you have located your mail recipient, you will also discover other relevant data such as postal address, phone number, fax number, organization, and location.

Each E-mail system connects to the Information Switch through a Mail Integration Server (MIS), which is responsible for translating and transferring messages. Each MIS contains APIs that speak the native language of the E-mail system, thus eliminating the gateway requirement and en-

The quickest way between two points used to be a straight line.



AlisaMail provides direct support for many PC, Mac, and VMS E-mail products.

G. BORTEN / INFOWORLD

suring full system functionality (enclosures with file names attached, message priority flagging, and return receipts). On an inbound message, the MIS separates the message into discrete parts and then passes those parts to the Information Switch, which deposits the message in the appropriate delivery queue. The MIS picks up the message on the outbound or delivery side and converts the data to a form that the receiving E-mail system will understand. The MIS also assists in directory synchronization between E-mail packages and the Information Switch.

So how would AlisaMail compare with our solution? In order to launch our test suite with AlisaMail as the backbone, we would be forced to eliminate WordPerfect Mail, which is not directly supported (you could connect WordPerfect with another gateway, however, perhaps X.400). In our system, we could only update each mail system's address book and then propagate the changes across post offices within that product. With AlisaMail, maintenance is easier because each mail directory can be synchronized in real time or updated via a batch process. Each E-mail system handles directory synchronization differently, however. Microsoft Mail on the Mac is synchronized in real time and directories are always up to date. cc:Mail requires a batch process. For the MHS product, it propagates directories to AlisaMail but not vice versa. The MHS users are ideal PeopleFinder clients.

AlisaMail 4.0 also provides report generation and an accounting system to analyze and optimize system performance and even chargeback network messaging costs. AlisaMail's Management Utility also provides mail traffic monitoring and reporting, directory administration and reporting, configuration management, and accounting and operation control.

AlisaMail would have received top honors in our attachment file test, as it is capable of passing file names across platforms (Microsoft Mail Mac to Lotus cc:Mail DOS) and preserving the file name at the destination, wherever possible. According to Alisa, the only exception to correctly passing file name attachments is when there is a conflict with the naming conventions between different platforms.

We experimented with AlisaMail at the vendor's site, and it appears to handle reference addressing much better than the X.400 backbone and gateways. For example, using AlisaMail, if a cc:Mail user addresses a message to five local and 10 remote users, those 10 remote users are passed reference addresses (the complete address of the local user), allowing the remote users to reply to all original recipients. In replying to a message, AlisaMail employs a database maneuver called a reverse lookup in the SQL database. Once the correct record is located, AlisaMail compiles a complete address for the recipient.

The adage "You get what you pay for" applies to AlisaMail, or rather, you pay for what you get. AlisaMail requires a DEC VAX 3000 series or later. According to Alisa Systems, a DEC VAX 4000 series 90 is available for $12,000, and entry-level configurations for AlisaMail 4.0 begin at $10,000. We would like to see it on another platform, maybe Unix or Windows NT. Alisa also needs to connect directly to X.400 and SMTP. Currently, AlisaMail requires the use of DEC's Message Router.

Alisa Systems Inc., in Pasadena, Calif., can be reached at (818) 792-9474.

— Laura Wonnacott

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Da Vinci eMail
Version 2.01a

We used Da Vinci eMail, Version 2.01a (the DOS client) with MHS, Version 1.5N, and the Retix MHS X.400 gateway, Version 1.5.

SETUP:
The directory setup in Da Vinci was similar to cc:Mail's. It was just a matter of entering all the correct X.400 aliases to the address list. You can create an X.400 template so that addresses are entered form-style; this facilitates somewhat the setup of directories. Unlike with BeyondMail, we did not create a special entry in the MHS routing table.

MAINTENANCE:
As with BeyondMail, there were no special maintenance problems. Changes to the user address list is done manually by retyping changes in the expanded X.400 addresses.

RELIABILITY:
Like Beyond, we ran into the same MHS X.400-related gateway problems with INGATE that resulted in the MHS X.400 gateway aborting to DOS.

INTEROPERABILITY:
Da Vinci consistently truncated the subject on incoming and outgoing messages, because the subject field in Da Vinci is 31 characters — much shorter than the 60-character length of our test subject. Da Vinci experienced the same text file corruption as the other MHS products when receiving text file attachments from Microsoft Mail with the file extension TXT.

Whenever Da Vinci received a message from a non-MHS package, the From field showed the most accurate and friendly representation of the originator's ID. It used the alias name it found in its own directory for the originator.

For example, we named our cc:Mail user (at the Da Vinci end) JSmith-CCMAIL1 in order to identify this person as a ccMail user named JSmith. We also had a local JSmith Da Vinci user, which could have been a different person altogether. When a message came in from JSmith using cc:Mail, Da Vinci accurately identified the message as originating from JSmith-CCMAIL1 — and not just JSmith. It does this by comparing the incoming X.400 address with the addresses in its own directory and then displaying the alias ID associated with that address. There is no parsing, however — this is a simple character string comparison.

That's why messages originating from MHS products, including Da Vinci itself, were represented in full (and unfriendly) X.400 format. Some MHS products tag a comment field to the end of the address — which is an acceptable MHS procedure, but it causes a mismatch in the Da Vinci address book. With some tinkering, we were able to get Da Vinci to recognize addresses coming from BeyondMail and then represent all incoming BeyondMail addresses in a friendly format. With some tedious work, one might conceivably synchronize all the E-mail packages well enough for Da Vinci to recognize incoming messages within a local enterprise.

Like Microsoft Mail, Da Vinci never recognized messages as high priority. Apparently, MHS can set the priority of a message in two ways: One way conforms to an older specification of MHS, the other to a more recent specification. The MHS gateway is setting the priority according to the more recent specification, and Da Vinci is not checking it. Da Vinci eMail does not give you the option of replying to all original recipients.

INTEROPERABILITY TESTS — INFO WORLD

Da Vinci eMail

	cc:Mail	Da Vinci eMail	BeyondMail	Futurus Team	Microsoft Mail	WordPerfect Mail
Subject	Truncated[1]	Truncated[1]	Truncated[1]	Truncated[1]	Truncated[1]	Truncated[1]
Six file attachments > 1MB	No[1]	No[1]	No[1]	No[1]	No[1]	No[1]
One file attachment 50K	Yes	Yes	Yes	Yes	Yes	Yes
File attachment names	None	None	None	None	None	None
Total IDs in TO list	1	1	1	1	1	1
CC:	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed
Originator's address	Accurate	Accurate	Accurate	Accurate	Accurate	Accurate
Address representation	Unfriendly	Unfriendly	Unfriendly	Unfriendly	Unfriendly	Unfriendly
Reply to originator	Yes	Yes	Yes	Yes	Yes	Yes
Reply to all original	No	No	No	No	No	N/A
Reply to reply	Yes	Yes	Yes	Yes	Yes	Yes
Return receipt	Yes	Yes	Yes	No	Yes	Yes
Correct priority	Yes	No	Yes	Yes	No	Yes
Word wrap correct	No	No	No	No	No	No

[1]Da Vinci subject is limited to 31 characters and did not accept our full subject test.
[2]MHS gateway failed repeatedly during sa-file transfer.

Microsoft Mail
Version 3.0

We used the Microsoft Mail for PC Networks (Windows client) Version 3.0 with the Microsoft Mail Gateway (also by Microsoft), Version 3.0. The gateway was connected to the Retix OpenServer by an X.25 connection. The X.25 card on the gateway machine was an Eicon EC/PC. The X.25 card on the Open Server was a Retix PC-320.

SETUP:
Microsoft would have been one of the easiest gateways to set up, had it not been for its unique requirement of an X.25 connection to communicate with the Retix OpenServer 400. The Retix OpenServer regards all the other connections as gateways on a network, but it sees the Microsoft Mail connection as a direct line to another message transfer agent, via an X.25 connection.

We had an enormous amount of trouble making the X.25 connection work. One of the problems turned out to be an embarrassing side effect of installing Microsoft Mail last. (See How We Test, page 90.)

Setting up X.400 alias addresses is a cinch in Microsoft's gateway. We simply filled in a form and defined the alias name and we were ready to go. We needed to define a return route to the gateway for incoming messages. This was an X.400 address where we assigned normal X.400 fields to point to the network name and post office for the receiving Microsoft Mail MTA. In our case, we followed the sample in the manual — the X.400 organization field specified the network name, and the organizational unit specified the post office.

MAINTENANCE:
As with all the other products, changes must be made manually by updating the user directory at the post office. Microsoft makes synchronization of the X.400 user address lists automatic between Microsoft post offices, even if the post

Continued on next page

INTEROPERABILITY TESTS — INFO WORLD

Microsoft Mail

	cc:Mail	Da Vinci eMail	BeyondMail	Futurus Team	Microsoft Mail	WordPerfect Mail
Subject	Truncated	Truncated	Truncated	Truncated	Truncated	Truncated
Six file attachments > 1MB	No[1]	No[1]	No[1]	No[1]	Yes	Yes
One file attachment 50K	Yes	Yes	Yes	Yes	Yes	Yes
File attachment names	None[2]	None[2]	None[2]	None[2]	None[3]	None[2]
Total IDs in TO list	6	1	1	1	6	1
CC:	Yes	No	No	No	Yes	No
Originator's address	Accurate	Accurate	Accurate	Accurate	Accurate	Accurate
Address representation	Unfriendly	Friendly	Unfriendly	Unfriendly	Friendly	Unfriendly
Reply to originator	Yes	Yes	Yes	Yes	Yes	Yes
Reply to all original	No	No	No	No	Yes	N/A
Reply to reply	Yes	Yes	Yes	Yes	Yes	Yes
Return receipt	Yes	Yes	Yes	No	Yes	No[3]
Correct priority	No	No	No	No	No	No
Word wrap correct	Yes	Yes	Yes	Yes	Yes	Yes

[1]A problem occurred on the ASCII text file only when file name extension was TXT.
[2]File names were included in a message but not associated directly with the attachments.
[3]Microsoft Mail gets a receipt from Postmaster but the recipient is not identified.

Futurus Team
Version 2.02c

We used Futurus Team, Version 2.02c with MHS, Version 1.5N and the Retix MHS X.400 gateway, Version 1.5.

SETUP:
Futurus Team had a unique method of adding X.400 user addresses to the remote user list — a text file and your own editor. This "lazy" approach may be boon or bane, depending on how much you like to use text editors. We used the speedy and flexible Qedit, whose on-the-fly macro capability really smoothed out the process of entering all the addresses — so this method worked to our advantage.

There is no predefined dialog box for entering X.400 addresses, but you can configure your text entries in the text file to assume some portions of the X.400 address and then have Futurus pop up a data entry form for you to fill in the unknown parts. This can be used for any addressing scheme, not just X.400. The scripting language that makes this possible is not particularly elegant, but it can be used to help automate addressing. We preferred the manual labor method of adding complete pre-defined addresses to the text file, however.

MAINTENANCE:
Changing X.400 user addresses is simply a matter of re-editing the remote user text file. You can keep private remote user lists in each of the Futurus users' directories, as well. While this can be a convenient method of building private lists, it makes for an awful lot of editing if a popular address changes.

RELIABILITY:
Since Futurus used MHS in our tests, we met the same MHS X.400 gateway problems as in BeyondMail and Da Vinci.

We had an intermittent problem when we sent the six-attachment message from cc:Mail to Futurus. When Futurus Team attempted to return receipts for each message, it received nondelivery reports for all of them. It couldn't clear the return receipt messages, however. Without rereading the original messages, some unidentified link in the chain simply kept regenerating nondelivery reports, ad infinitum. The only way we could stop it was to log in as supervisor and manually delete the messages from the MHS message queue. We were able to recreate this scenario twice but never again after that, so it was impossible to pin down the source of the problem. It only occurred when we sent six file attachments.

INTEROPERABILITY:
Futurus Team consistently registered the correct priority of incoming messages, except when the messages originated in Microsoft Mail. Futurus Team most often presented message text without adding blank lines when the originating message had wide margins.

When the other MHS products received a corrupted text file in our file attachment tests, Futurus Team did as well. Futurus was never able to return a receipt when a message was read, although it always tried. Each time Futurus attempted to return the receipt, we got a nondelivery report. We suspect it is truncating the return address when returning receipts.

Inexplicably, when Futurus originated a message, and WordPerfect Mail replied to the Futurus message, Futurus was never capable of replying back. The Futurus nondelivery report simply indicated an "unknown error." This problem may also be due to a truncated return address.

INTEROPERABILITY TESTS — INFO WORLD

Futurus Team

	cc:Mail	Da Vinci eMail	BeyondMail	Futurus Team	Microsoft Mail	WordPerfect Mail
Subject	Corrupt	Truncated	Corrupt	Corrupt	Corrupt	Truncated
Six file attachments > 1MB	No[1]	No[1]	No[1]	No[1]	No[1]	No[1]
One file attachment 50K	Yes	Yes	Yes	Yes	Yes	Yes
File attachment names	None	None	None	None	None	None
Total IDs in TO list	1	1	1	1	1	1
CC:	No	No	No	No	No	No
Originator's address	Accurate	Accurate	Accurate	Accurate	Accurate	Accurate
Address representation	Unfriendly	Unfriendly	Unfriendly	Unfriendly	Unfriendly	Unfriendly
Reply to originator	Yes	Yes	Yes	Yes	Yes	Yes
Reply to all original	No	No	No	No	No	N/A
Reply to reply	Yes	Yes	Yes	Yes	Yes	No[2]
Return receipt	Yes	Yes	Yes	No	Yes	Yes
Correct priority	No	No	Yes	Yes	No	Yes
Word wrap correct	No[3]	Yes	Yes	Yes	Yes	Yes

[1]MHS gateway failed repeatedly during six-file transfer.
[2]Futurus returns an "unknown error" message.
[3]Tabs were converted into nonstandard characters.

Continued from previous page
offices communicate via the X.400 backbone. Microsoft has published a free "directory synchronization with foreign mail systems" specification that opens its directory synchronization protocol to other vendors. The Microsoft Mail FFAPI (file format API) SDK is also available separately for programming your own gateway to Microsoft Mail.

RELIABILITY:
Once we were successfully passing messages back and forth through the Microsoft Mail gateway, we still had a number of minor problems with the Retix OpenServer. We had to juggle a number of command-line parameters and configuration settings in order to get the OpenServer to switch reliably between the network connections to gateways and the X.25 connection to the Microsoft Mail gateway. Once these parameters were ironed out, we still had reliability problems, although they were infrequent. The Microsoft Mail gateway occasionally froze during transfers of large message files, requiring a restart.

It took the longest to pass a message to or from Microsoft Mail, due to the fact that it was communicating via an X.25 line at 19,200 bits per second. The other products communicated via Ethernet on the network. Your results with Microsoft Mail will depend on the speed of your physical connection.

INTEROPERABILITY:
Microsoft Mail had the highest degree of interoperability overall. On the down side, Microsoft Mail never sent or received the correct priority status of a message, although the priority was sometimes correctly indicated in the text of the message. This was true even when Microsoft exchanged messages with itself through the gateway.

As noted earlier, when we attached a text file with the extension TXT from Microsoft Mail, the MHS gateway and cc:Mail gateway processed the file improperly. Microsoft Mail provides a simple work-around. You can configure the gateway to automatically use a specific file format when processing files with any given extension. You could, therefore, configure the gateway to send files with the TXT extension as binary, thus solving interoperability problems.

Microsoft was at its best when replying to all original recipients of a message. Although the interoperability was not perfect in this respect, no one else came close. Whenever it did not receive a full list of original recipients, the originator was an MHS product, pointing to the MHS gateway as the most likely culprit.

Only when the message originated from an MHS product was an unfriendly address displayed. Usually, Microsoft Mail represents addresses by the friendliest names possible (Microsoft presents the user name where possible). This can be confusing if you get a message from a remote JSmith via X.400, since all you'll see is JSmith. If there is both a remote and local JSmith, all you have to do is double-click on the name. That brings up a window of detail identifying exactly which JSmith originated the message.

WordPerfect Mail
Version 3.1

We used WordPerfect Mail for Windows, Version 3.1 with the WordPerfect Connection Server 3.1 and the WordPerfect X.400 Gateway for Retix OpenServer, Version 2.0.

SETUP:
The WordPerfect Office and gateway was by far the most tedious and complex installation. Considering how elegant the WordPerfect Mail for Windows system is and how easy it is to operate, this is a sore disappointment. To get a mail system and gateway working requires editing at least four databases (WordPerfect calls them notebook files): the host notebook, user notebook, X.400 GATE notebook, and the Gateway User List (GUL) notebook. Each time the GUL notebook changes, you must reindex it with a separate utility, GULINDX.

The setup for the WordPerfect gateway input and output queues made more sense than for the MHS and cc:Mail gateways (both Retix products). The MHS gateway and cc:Mail gateway regarded the input and output queues in reverse of the server — the gateway input queue points to the output queue of the server, and so on. On the other hand, WordPerfect setup just wants you to specify the server's input and output queue in the input and output fields, respectively. Clearly, there is no right and wrong here — but it was awfully confusing when jumping from one gateway to another.

WordPerfect provides a number of options for X.400 addressing. Unfortunately, the interaction and the combinations are so confusing, we're still not sure we fully understand how they interact. First, we entered a full X.400 address as an alias expansion of each remote user ID in the user notebook. When addressing a message, we could use the friendlier and shorter user name; WordPerfect Mail expanded it to its full X.400 address later (this is how most of the other products work, as well).

However, the gateway also uses the separate Gateway User List notebook. If we didn't create an alias, WordPerfect Mail would attempt to look up the X.400 address in the GUL file. When we defined an alias in the user notebook, the GUL was ignored for routing outgoing messages, but it was still used to send out the originator's X.400 return address along with the message. Finally, we could specify addresses such that the WordPerfect gateway would encapsulate the message to retain all the original WordPerfect formatting codes. This only benefits a WordPerfect to WordPerfect message transfer, so we did not take advantage of the encapsulation feature.

MAINTENANCE:
Maintenance is almost as tedious a chore as installation. Every time you change user information, you must regenerate the Office system. If the change affects an X.400 address, you must update the GUL file and then reindex the file using the GULINDX utility. A utility called MAKEGUL will build a GUL file based on your current user directory. In order for MAKEGUL to add all the necessary X.400 fields properly, you need to edit a configuration text file, which defines the rules MAKEGUL will use for creating a proper GUL notebook file.

RELIABILITY:
In some cases when using WordPerfect, we had to enclose the entire X.400 address in quotes for the Domain Defined Attribute portion of the address to work. Without the quotes, the WordPerfect gateway would report an error when it processed the message (at the gateway machine's screen only, not as a nondelivery report). It would never clear the offending message from the queue, however. The error would be reported indefinitely each time the gateway goes through its cycle. We had to delete the message from the queue manually to restore the system to normal. In some cases, we had to delete status files to get the WordPerfect gateway operational again.

INTEROPERABILITY:
Microsoft Mail and WordPerfect Mail seemed to display the most inexplicable relationship. When WordPerfect Mail received replies from Microsoft Mail, they were always missing the text of the message. Sometimes it was impossible for WordPerfect Mail to delete the reply from the in-box.

But most unusual were the file transfers. When WordPerfect originated the message with six file attachments, the only two products that failed to receive all the attachments properly were Microsoft Mail and WordPerfect Mail. When the message originated from Microsoft, the only two products to receive all the file attachments in an uncorrupted form were Microsoft Mail and WordPerfect Mail. In our single-file attachment test, the WordPerfect gateway succeeded in sending uncorrupted text files to only Microsoft Mail and WordPerfect Mail. It succeeded in sending the remaining five files to all others but Microsoft Mail and WordPerfect Mail.

WordPerfect Mail did the worst when sending the six file attachments through the gateway to another WordPerfect Mail user. Technical support at Word-Perfect confirmed that the gateway refuses to receive multiple files that add up to more than 1 megabyte. WordPerfect Mail can receive much larger files, however, when sent as one attachment.

WordPerfect Mail displayed the correct message priority when receiving from all but Microsoft Mail. WordPerfect Mail returned a receipt to everyone except another WordPerfect user and Microsoft Mail. When the WordPerfect Mail user opened the Microsoft-originated message, Microsoft Mail received a notice from the Postmaster that a message somewhere was received, but the receipt did not identify the recipient.

INTEROPERABILITY TESTS — INFO WORLD

WordPerfect Mail

	cc:Mail	Da Vinci eMail	BeyondMail	Futurus Team	Microsoft Mail	WordPerfect Mail
Subject	Corrupt	Truncated	Corrupt	Corrupt	Corrupt	Corrupt
Six file attachments > 1MB	No[1]	No[1]	No[1]	No[1]	No[2]	No[2]
One file attachment 50K	Yes	Yes	Yes	Yes	Yes	Yes
File attachment names	None	None	None	None	None	None
Total IDs in TO list	6	1	1	1	6	1
CC:	Listed	Not listed	Not listed	Not listed	Listed	Not listed
Originator's address	Accurate	Accurate	Accurate	Accurate	Accurate	Accurate
Address representation	Friendly	Friendly	Unfriendly	Unfriendly	Friendly	Unfriendly
Reply to originator	Yes	Yes	Yes	No	Yes[4]	Yes
Reply to all original	No	No	No	No	Yes[4]	N/A
Reply to reply	Yes	Yes	Yes	No	Yes	Yes
Return receipt	Yes	Yes	Yes	No	Yes	No
Correct priority	Yes	No	Yes	Yes	No	Yes
Word wrap correct	No	No	No	Yes	No	No

[1] A problem occurred on the ASCII text file only when filename extension was TXT.
[2] Only two of the six files arrived at Microsoft Mail.
[3] WordPerfect could not receive six files adding up to greater than 1 megabyte.
[4] WordPerfect Mail gets Microsoft Mail's reply, but WordPerfect occasionally cannot delete the message from the queue.

X.400 addressing with gateways: an attempt at simplicity

One of the ideas behind X.400 was to establish an addressing standard. Addresses would include at least four fields to route messages to a post office. These fields include country, administrative domain, private domain, and organization. An example address might be /C=us/ADMD=telemail/PRMD=infoworld/O=iwwpo, where "iwwpo" routes the message to the *InfoWorld* WordPerfect Office connection server. In addition, there are four optional organizational unit fields (/OU) that can further identify divisions and subdivisions at the destination, such as OU1=marketing, OU2=electronics. Finally, the message is routed via a surname and/or given a name field, such as /S=Kizidek/G=Mel.

If it stopped here, this addressing scheme would seem rather straightforward. In practice, the gateways usually demand a more complex addressing scheme. Worse, each one has its own variation on the X.400 theme.

In practice, the gateways usually demand a more complex addressing scheme.

There are a number of optional fields provided in X.400 addressing to accommodate the individual needs and style of gateways. Of these additional fields, most of the gateways use the domain defined attribute (DDA) fields. Four DDA fields are available, but the gateways used in our tests only use one. Each DDA has two parts: a domain type, and a domain value (sometimes identified as /DT and /DV). The domain type is a character string identifying the domain value. The domain value field can contain either text or binary data.

The gateways we used prefer to see these fields represented differently, which makes the setup of multiple products confusing. For example, cc:Mail used the syntax /DT=ccmail1/DV=Mel_Kizidek to route a message to the post office ccmail1 and the person with user name Kizidek. MHS also used /DT and /DV, but the syntax was something like

See X.400, page 100

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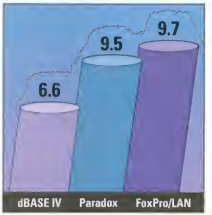

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Hype.

Saying bon voyage to your old spreadsheet is easier than you think.

Facts.

This Microsoft ad on the left has a lot to say about their spreadsheet, Microsoft® Excel. It also has a lot to say about *our* spreadsheet, 1-2-3. But before you believe their ad, ask yourself "What are the facts and what's just hype?"

According to their ad, Microsoft Excel will read and write all your Lotus® 1-2-3® spreadsheet files and run your 1-2-3 macros unmodified. Well, that'd be very impressive–if it were all true. But the fact is, Excel *can't* read Allways files; or preserve formulas containing a 3D range; nor can it convert some WK3 files to Workbooks; and it certainly can't run 1-2-3 macros containing commands from versions after Release 2.01.

Now, the ad on the left also tells you that a 1-2-3 user need only type in a 1-2-3 command and Excel will show the equivalent command. Wrong, again. Excel only supports 1-2-3 Release 2.01 commands. In fact, Excel can't execute your familiar commands from Releases 2.2, 2.3, 2.4 and 3.1. Try pressing */, Range, Search* in Excel and see what happens. Absolutely nothing.

The fact is, if you're a DOS spreadsheet user, only 1-2-3 for Windows makes sense.

If you're a 1-2-3 user, you've created and saved hundreds of 1-2-3 files, styles and macros. It would certainly simplify your life if you could continue to use them, wouldn't it? Well, any 1-2-3 for DOS file, style or macro can be read and executed by 1-2-3 for Windows. And only 1-2-3 for Windows™–with its built-in Classic™ Menu–lets you use your familiar 1-2-3 commands. Plus, only 1-2-3's 3D technology gives you easy access to 256 Worksheets and lets you build true 3D formulas. In comparison, Excel's Workbook offering is a limited imitation of true 3D. Try opening a large 1-2-3 3D file in Excel and see what happens. If you're lucky, it will work. So for the 1-2-3 for DOS user moving to Windows, why would you use anything but 1-2-3?

The fact is, the new 1-2-3 for Windows is better than ever.

The latest release of 1-2-3 for Windows now includes performance enhancements. (For example, it's now the fastest Windows spreadsheet for printing on PostScript® printers. It's also the fastest to launch.) We've also added over 25 innovative new features, usability enhancements and new programming tools. New features include: customizable SmartFill which lets you create custom lists such as sales offices, department names, employee lists, etc. and use them again and again (a feature not found in Excel); SmartFormat, which gives you pre-defined table formats; 3D SmartSum for summing up columns or rows across and through your 3D worksheets; and the ability to create custom GUI-style dialog boxes. The result–1-2-3 for Windows is now one of the most powerful and easy-to-use spreadsheets ever developed.

And, if you're a spreadsheet user who needs to access external databases, 1-2-3 for Windows remains unmatched–particularly if you need relational capabilities. The fact is, Excel's data access capabilities rest on a third-party product that offers limited relational capabilities. Which explains why Corporate Computing (August 1992) recently wrote that "for the experienced 1-2-3 database user, 1-2-3 for Windows with DataLens™ is the front-end tool of choice."

In fact, not only do people prefer our product, but according to the ComputerWorld Spreadsheet Brand Preference Study, more people prefer our company. Lotus beat everybody (including Microsoft) for the awards of "best company to do business with" and "company that offers the best service and support."

Before you decide on a spreadsheet, remember–no one knows more about spreadsheets–and the people who use them–than Lotus.

For more information visit your Authorized Lotus Reseller or call us today for your free auto demo at **1-800-TRADE-UP, ext. 7116.*** After all, hype only goes so far.

Lotus 1-2-3 for Windows

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Seamless link can be achieved

Attempting to integrate dissimilar electronic mail systems via an X.400 backbone can often lead to a distorted and incorrect understanding of the role of X.400 in the enterprise. X.400 is not a "plug-and-play" solution; rather, it is a technology that provides connectivity. But it doesn't provide seamless connectivity without a lot of help. What we need is refined connectivity, and this can often be achieved by employing single-vendor solutions that cater directly to the needs of the end-user community.

Suppliers of gateways can get away with merely touting adherence to the X.400 specification. In doing so, however, there is the implication that a written-to-spec X.400 gateway is absolved of any responsibility for end-to-end connectivity (cc:Mail to QuickMail, for example).

There are at least two companies, however, that offer seamless end-to-end connectivity via a family of software and hardware products — SoftSwitch Inc. and Worldtalk Corp.

Worldtalk 400 and SoftSwitch EMX are distributed solutions, both predicated on an X.400 backbone. Both are built with the understanding that X.400 is based on an international standard and is a manageable, open, independent, and secure foundation. Both the SoftSwitch EMX and Worldtalk 400 provide a high-performance 1988-compliant X.400 Message Transfer Agent (MTA). Both also offer X.500 centralized directory services.

Worldtalk 400 and SoftSwitch EMX are distributed solutions, both predicated on an X.400 backbone.

SOFTSWITCH. The recently announced SoftSwitch EMX family runs on a Unix-based Data General platform. SoftSwitch has upgraded its X.400 backbone to the 1988 standard, so now EMX can communicate with other MTAs in compliance with either the 1988 or 1984 X.400. Directory services are based on X.500.

SoftSwitch has gateways for Novell's Message Handling Service (MHS), Microsoft Mail, and cc:Mail. SoftSwitch EMX systems support SNA Distribution Services (SNADS), Simple Mail Transport Protocol (SMTP), and SoftSwitch Network Applications Programming Interface (SNAPI) protocols in addition to X.400. Currently, EMX can connect to Profs networks only through a Profs gateway.

The cost of the EMX switches are dependent on the throughput, protocol, transport, and physical connection requirements of the system administrator. Prices start at $29,995 for the entry-level EMX 1000 (which supports only two protocols), to about the $300,000 range for the high-power EMX 8000 (supports all four protocols and runs much faster). The midrange EMX 4000 supports all four protocols and costs about $150,000. SoftSwitch, based in Wayne, Pa., can be reached at (215) 640-9600.

WORLDTALK. Incorporated this March, Worldtalk purchased its technology from failed Touch Systems. Worldtalk's strength lies in its powerful partnership with Hewlett-Packard as a strategic independent software vendor (ISV). Its product is a result of cooperative development between HP and Worldtalk, uniting HP's X.400 OSI technology and advanced RISC platform with Worldtalk's E-mail integration technology. HP provides the hardware, operating system, enhancements, protocol support, network management support, and X.500 centralized directory support. Worldtalk provides the complementary software — gateway and translation software, network management agent, and directory links.

The Worldtalk 400 server and mix-and-match intelligent gateways provide messaging integration, directory services, format translation, and management services. A PC Unix-based Worldtalk 400 server is also available (1984 X.400 MTA), but Worldtalk's premier product is the 400 server running on an HP 9000.

The gateways control the entry and exit of messages at the gateway level and run as API clients to HP's X.400 MTA. The gateway software contains facilities that prepare the message to be deciphered at the receiving end. Worldtalk assumes responsibility for the gateways and their translation quality. Worldtalk provides intelligent gateways for Lotus' cc:Mail, Microsoft Mail for the Mac, CE Software's Quick-Mail, MHS, and SMTP.

How would the Worldtalk 400 server and gateways have held up in our test? First we would have to eliminate two products — WordPerfect Office and Microsoft Mail for the PC. Worldtalk does not furnish gateways for these E-mail systems, although we could enter the backbone via X.400.

Worldtalk achieves a higher level of integration using its alias manager. The alias manager alleviates much the addressing chaos by directing the address translation. It manages the relationship between full X.400 addresses and their associated aliases. This relationship is stored in the directory database so that each E-mail user can easily locate the aliases.

Worldtalk provides three forms of aliasing. Table-based aliasing is bidirectional mapping between X.400 and aliases performed by correlating matched pairs in a table. Rule-based aliasing also employs bidirectional mapping, but it applies a predefined algorithm or rule. You can look up a corresponding address value for an alias by applying the rule. Auto-registration automatically creates unique aliases for incoming messages and is also available.

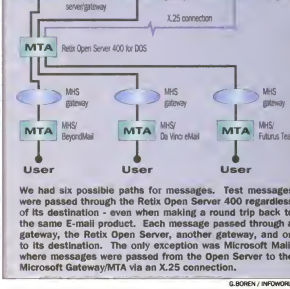
Worldtalk, like SoftSwitch, has the more mature 1988 X.400 compliance compared with the 1984-compliant Retix Open Server 400 (the 1988 specification includes a more sophisticated handling of file attachments). We spent a day working with the Worldtalk 400 on the HP 9000 and enjoyed successful message transfers among cc:Mail, SMTP, and Da Vinci eMail clients. There was no corruption of the subject line, and we saw the entire contents of a message returned, file attachments included, when a delivery was unsuccessful.

A typical HP 9000 setup supports 5,000 to 120,000 users. The HP 9000 begins at $20,000. Pricing for the Worldtalk 400 for the HP 9000 begins at $23,950 with gateways available separately for $1,500 each.

Worldtalk, in Los Gatos, Calif., can be reached at (408) 399-4000.

— Joanna Tsang and Laura Wonnacott

Interconnecting via an X.400 backbone



We had six possible paths for messages. Test messages were passed through the Retix Open Server 400 regardless of its destination - even when making a round trip back to the same E-mail product. Each message passed through a gateway, the Retix Open Server, another gateway, and on to its destination. The only exception was Microsoft Mail, where messages were passed from the Open Server to the Microsoft Gateway/MTA via an X.25 connection.

G.BOREN / INFOWORLD

X.400 / from page 96

X.400 addressing with gateways

/DT=MHS/DV=Mel_Kizidek(a)MHSATE. The gateway converts the "a" and parentheses to the @ sign. WordPerfect prefers the syntax DDA.WPMAIL=WPO1(Mel_Kizidek), where WPMAIL is a domain type defined by a WordPerfect Office, WPO1 is our WordPerfect host, and Kizidek is the name of the user.

Microsoft had a method of addressing quite different from the rest, one that was more flexible. The system administrator defines how the fields will be interpreted by the Microsoft Message Transfer Agent (MTA). The sample in the manual uses the organization field to define the network name, the organizational unit field defines the post office, and the surname (and optional given name) field gets the message to the right user. A typical Microsoft Mail address could look like this: C=us/ADMD=telemail/PRMD=infoworld/O=emailx400/OU1=enterprise. emailx400 would be the name of our network, and enterprise the name of the post office.

The products let you define these lengthy addresses behind the scenes.

Fortunately, all the products let you define these lengthy addresses behind the scenes so that you can send mail to someone listed as Mel Kizidek and still get the message to the right person via an X.400 address. But not all products kept the X.400 address transparent on incoming messages.

— Nicholas Petreley

COMMUNICATE / from page 85

Interoperability among dissimilar E-mail

based on our findings, it may be the preferable way to go.

But when departments are determined to keep using their chosen E-mail product, interconnection through a backbone may be the only attractive alternative. It is also the only solution when an enterprise has widely varying platforms and no one vendor supports them all. The most compelling reason may be remaining competitive. As your competition begins to forge better connections by accepting mail via Internet or MCI Mail or by intermingling mail systems with its customers, it is going to become harder to avoid the issue of interoperability.

HOW WE TEST / from page 90

Connecting E-mail packages via X.400 backbone

RELIABILITY:
We sent a message with six large file attachments to stress the E-mail gateways and see if any would break under the pressure. Two did — the MHS gateway and WordPerfect gateway. We examined how difficult it was to recover from such failures.

We also looked for any other unusual behavior, such as error messages that wouldn't clear and undelivered messages that gateways wouldn't delete. Both types of behavior surfaced.

INTEROPERABILITY:
We ran two interoperability tests, one with a single text file attachment of 50K and another with six attachments adding up to about 1.4 megabytes. The six-file test included a text file of 782K, a 71K dBase file, an executable file of about 227K, a 114K Microsoft Word document, an Excel spreadsheet of 202K, and a bit-mapped file about 38K in size. Each time, we sent a message from one product to all the other products, including a message to another user running the same software.

The messages had a 60-character subject, including special characters like the pound sign, caret, percent sign, curly braces, etc. None of the products received all of the characters of the subject field properly. Da Vinci always truncated the subject before the special characters began, however.

We discovered MHS quirks that caused setup headaches.

We checked the integrity of all the file attachments that made it through and noted when a product indicated the original file names. No product presented the correct file names along with the attachments in the friendly way that they would if the messages were sent locally. Microsoft Mail was the only one to send a list of file names along with the message at all, although we ourselves still had to match the names with the attachments.

We checked the number of original recipients listed in the original To list. We also checked to see if the carbon-copied recipient was listed. The names were examined for accuracy and friendliness. We considered a user name without the X.400 address unfriendly (including a user name with just a gateway name) to be friendliest. If only the entire X.400 address was listed, it was considered unfriendliest. Some products compromised and placed the surname at the front, followed by the complete X.400 address. Although this is a reasonable compromise, we considered it cluttered and unfriendly.

If some or all of the original recipients were listed, we tested the product's capability to reply to them all at once. Otherwise, we simply checked to see whether the product could reply only to the originator (Futurus Team and WordPerfect Mail are designed to reply only to the originator of a message). We also checked to see if the originator could reply to the reply.

When we opened a message, we verified whether the originator got a receipt message. All originating messages were set at the highest priority, and we always requested a return receipt. We checked the in box for each product to see if the message was marked as urgent (or the highest priority for that product).

The messages used all the text formatting features possible for the originating user, including tabs, margin settings, word wrap, bold, underline, and color highlighting. Some of the text formatting features we examined were admittedly frivolous, and we had little expectation they would survive the X.400 trip. Only a handful of the features were supported at all (mostly by ccMail), and none of them passed through a gateway. Of all the text formatting, only the word wrap survived (and that not consistently), which is why only the word wrap feature appears in our compatibility tables. In most cases, tabs were expanded to spaces, retaining the appearance of tabs.

Although margins and word wrap may be technically unimportant to communicating a message, we expected more consistency than appeared in our tests. Microsoft Mail sent word-wrapped text with a carriage return and line feed only at the end of a paragraph, so receiving products automatically wrapped text at their default margins. Others sent text at the original line lengths, so some of the recipients with narrow margins broke the text at unexpected places.

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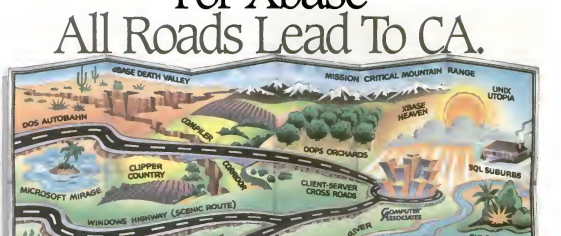

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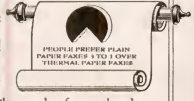

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Opening the windows on spreadsheets

We use a task-oriented approach to evaluating Excel, 1-2-3, and Quattro Pro

BY **JOHN WALKENBACH**
REVIEW BOARD

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TEST PLAN DEVELOPMENT AND TESTING CONDUCTED BY **ANDRE KVITKA** AND **VICTOR R. GARZA** OF THE INFOWORLD TEST CENTER

As with all other categories of PC software, Windows is the name of the game these days when it comes to spreadsheets. Although the DOS versions of Lotus 1-2-3 and Borland's Quattro Pro both feature optional GUI interfaces, they are really no substitute for Windows.

The number of Windows spreadsheets is limited, but those available provide virtually everything you need: plenty of analytical muscle, great graphics, excellent customizability, and habit-forming ease-of-use features.

This product comparison examines Microsoft Excel for Windows 4.0, Lotus 1-2-3 for Windows 1.1, and Borland's new Quattro Pro for Windows 1.0. Another Windows spreadsheet, Informix Software's Wingz, is being updated and is expected to be released later this year. And Computer Associates has plans to ship a Windows version of SuperCalc in the first quarter of next year. We will review these products when they become available.

If you have adequate hardware (a 386 machine and at least 4 megabytes of memory), Windows offers many advantages for spreadsheet activities. The WYSIWYG nature of the environment makes it easy to transform simple data into attractive numeric tables and reports. And you can employ a variety of options to depict the data graphically. Sharing data between applications has never been easier, thanks to the standard Clipboard Copy and Paste facilities, Dynamic Data Exchange (DDE), and Object Linking and Embedding (OLE). Although all three products support DDE, only Excel supports OLE as both a client and a server application. This allows other OLE-compliant applications to embed portions of dynamic data in an Excel spreadsheet and lets Excel do the same.

Microsoft Excel started out as a GUI spreadsheet in the Macintosh environment and became one of the first Windows applications. Since then, it has evolved into one of the most feature-rich products available on any platform. Lotus 1-2-3 has always been the top-selling spreadsheet, but Lotus' original Windows implementation left much to be desired. The latest update, Release 1.1, improves on the original, but many users are waiting to see what Release 2.0 (expected later this year) will offer. Borland's brand-new Quattro Pro for Windows was a long time in the making, but early users agree that it was well worth the wait. It blends some of the best features from Excel with some true spreadsheet innovations.

A year ago, we thought that spreadsheets had "maxed out" in the feature department. The new versions of Excel and Quattro Pro for Windows demonstrate how wrong we were. Excel, for example, extends analysis capabilities to new levels with a variety of analytical procedures. Quattro Pro's handy notebooklike three-dimensional worksheet structure, brilliant graphics, and unrivaled features for developers will appeal to both novice and advanced spreadsheet users. Although Lotus 1-2-3 for Windows lacks the level of innovation found in Excel and Quattro Pro for Windows, users continue to be at-

See SPREADSHEETS, page 105

Our new task orientation

InfoWorld's feature-by-feature spreadsheet evaluation procedures have been replaced with a task-oriented approach incorporating ease-of-use factors into each task. These changes are discussed in detail in the "How We Test" section of this report. The new system means that scoring categories and weighting will be different than in previous reviews.

We plan to phase in this task-oriented approach for comparisons in other product categories. We welcome your response to this new approach. Please contact us by fax at (415) 358-1269, by Internet at Ann_Marcus@InfoWorld.com, by MCI Mail at 535-6757, or by CompuServe at 72166, 575.

Applying a task-oriented approach to spreadsheet testing

HOW WE TEST WINDOWS SPREADSHEETS

With this product comparison, we introduce our new spreadsheet testing and scoring methodology. As spreadsheets play catch-up with one another on a long list of features, we chose a different approach in evaluating these products.

Our new performance evaluation approach is task oriented. We developed a series of well-defined tasks that represent the types of applications for which spreadsheets are typically used. We then used each spreadsheet to complete the tasks, noting its strengths and weaknesses and how easily it was able to accomplish the task. You'll notice that we no longer have separate Ease of Use and Ease of Learning categories; these factors are now evaluated as part of Performance.

PERFORMANCE:
(Reviewer Testing)
The Performance portion of the Report Card is divided into 11 sections: basic operations, data consolidation, data manipulation and reporting, macro and customization, text file import, 1-2-3 macro compatibility, formatting and presentation, network access, SQL database access, other features, and speed. We give speed scores for operation and output.

In evaluating a task, we award extra points for particularly elegant implementation of features relevant to the task (or related tasks), multiple ways of accomplishing the same action, automatic features, or if we were impressed with how well or how easily a product handles such activities. For example, none of the tasks specifically calls for a custom numeric format. However, if a product implements such a feature well, it would earn a bonus in the Formatting category.

This is a departure from our previous approach to scoring, which focused on the feature set necessary to earn a particular score in a category. We found that the previous method often favored a particular set of features but did not always address how well the features were implemented or whether they were useful. The new scoring criteria are not as concrete, but they offer more detail on the technique a product uses to get the job done, and therefore, why we scored it the way we did. As always, you can draw your own conclusions. An excellent score indicates that there is virtually no room for improvement — a rare rating. We deduct points for lack of a common feature, clumsy implementation, difficulty in learning or using features, or erroneous results.

We evaluated the equipment using a 486/33 system from EPS Technologies, with 8 megabytes of memory, running DOS 5.0 and Windows 3.1.

Basic operations: This task involves a relatively large data-entry job to update information in an existing worksheet (five columns by 25 rows). This would be a typical task to enter monthly sales data for tabulation by region and by month. Next, we expanded an existing summary table to include formulas that use the new data. We updated an existing three-dimensional bar chart to include the new data range as well. Finally, we printed the summary table and chart on a single sheet of paper. The scoring on this task also included ease of use features, shortcuts, and general navigation.

Data consolidation: This task involves consolidating information from six regional worksheets that are stored in WK1 format. These small worksheets contain monthly budget information and consist of a column of eight category names and the corresponding values. Worksheets may have the categories ordered differently, and each will not have every category. Furthermore, we assumed that this task will be repeated monthly, so we looked at the initial setup, the actual consolidation, and how easy it would be to repeat the process. We assumed that each regional worksheet will be laid out the same from month to month. Note: Consolidation speed is considered under our Speed category.

Data manipulation and reporting: This task uses a dBase file of 1,000 records with 10 fields each — typical of data files generated from a simple service-evaluation questionnaire. Each field holds a value from one to six, representing an individual's rating on a particular item.

The goal of this task is to import the data, calculate the mean, median, standard deviation, variance, minimum, and maximum for each variable, and generate six frequency tables that show the number of each response for each field. In addition, one of the variables was cross-tabulated by another variable. The final step in the task was to create a 10-by-10 matrix showing the correlation coefficient for each pair of variables.

Although not all users will employ their spreadsheets for this type of activity, it is representative of "crunching numbers" and working with a large file. Scoring in this category also takes into account any other features the product offers for manipulating and analyzing spreadsheet data.

Macro and customization: This task involves setting up a simple user interface that will allow a user to select to display or print one of six predefined charts. The user makes two choices: which chart, and whether to view or print it. The interface can involve either custom dialog boxes or menus. Evaluation in this category includes general macro capability, as well as the ease with which the user can debug or modify a macro (or other customization feature).

Text file import: This task involves importing an ASCII file — typical of a file that might be generated by a mainframe — and parsing the data into columns, as necessary. Note that all lines of text in the input file are not necessarily formatted the same. There are also page headers, column titles, and data detail included.

1-2-3 macro compatibility: This task involves executing or translating three 1-2-3 macros (developed in 1-2-3, Release 2.1). The first macro counts the number of words in a range specified by the user. The macro is fairly short but moderately complex. It does not use any features that are unique to 1-2-3. The second macro is a complex, menu-driven application that relies heavily on displaying particular screens, fixing titles, and simple interactions with the user. The third macro is the one used in our Consolidation task, described in the Consolidation section above. The importance of this task will depend on how much you make use of existing 1-2-3 macros.

Formatting and performance: This task involves several common procedures: formatting a table to predefined specifications, creating and annotating a graph with a two-line message and an arrow, inserting the graph into a worksheet, inserting a 256-color PCX file into the worksheet, creating a text-only chart with bulleted points (typical of those used in presentations), and creating a simple flowchartlike drawing on the worksheet. Scoring on this task also includes general graphics capabilities and text-formatting features.

Network access: This task involves use of the product over a network. We evaluated access to both program and data files on the server from multiple workstations, the programs' security features including reservation availability, license control, and multiuser notification.

SQL Server access: This task involves accessing and modifying data from a SQL Server database. We evaluated such details as the products' ability to retrieve all or a portion of the SQL data, and the ability to create an aggregate column of data. We checked to see what format each product assigned to incoming data, text or numeric, and if numeric, whether two-decimal or general format. We checked the use of query-by-example (QBE) techniques, and

See HOW WE TEST, page 108

SPREADSHEETS, from page 104
tracted by its "1-2-3 Classic" command menu that mimics the interface found in Lotus' popular 1-2-3 for DOS product.

But the real news this time around is usability. The emphasis is not so much on the features as on how easily the features — especially the frequently used features — can be accessed. We are also seeing the potential for Windows to be more fully exploited. For example, the ability to directly manipulate elements has been extended from graphic objects to spreadsheet cells and ranges. If you want to copy or move a range of cells, you can use drag-and-drop techniques much as you would with a graphic object. Both Excel and Quattro Pro add some functionality to the normally inert right mouse button. Make a selection, right-click, and the software displays an appropriate menu or dialog box.

Contributing editor John Walkenbach is co-author of the PC World 1-2-3 for Windows Complete Handbook (IDG Books, San Mateo, Calif., 1991) and the PC World Excel 4 for Windows Handbook (IDG Books, 1992).

Executive summary

This product comparison focuses on the three major Windows spreadsheets: Microsoft Excel for Windows 4.0, Lotus 1-2-3 for Windows 1.1, and Borland's Quattro Pro for Windows 1.1.

Excel has been around almost as long as Windows itself and is now in Version 4.0. It is a strong contender in all areas. The latest version adds many new analytical features and addresses key usability issues. Excel should be your choice if number-crunching is what you expect first and foremost from your spreadsheet. The added analytical functionality sets Excel apart. And if you require SQL database access as part of that analysis, Excel is the one — especially since Quattro Pro for Windows doesn't offer it and 1-2-3 for Windows makes it tougher than necessary.

Borland's long-awaited **Quattro Pro for Windows** significantly extends the capabilities of the company's DOS-based Quattro Pro by adding three-dimensional worksheets and a unique set of tools to create custom user interfaces. If application development is your focus, Quattro Pro for Windows is your product. And if presentations are part of your job description, Quattro Pro's graphics capabilities are truly exceptional, particularly its slide show feature.

Lotus 1-2-3 for Windows pales in comparison to the other products. Perhaps its most appealing attribute is its 1-2-3 Classic menu system that lets veteran 1-2-3 users get up to speed immediately by using familiar "slash" commands. If compatibility with existing 1-2-3 macros is an issue, all three products handle them about equally well. Lotus has announced Release 2.0 of this product, which will apparently address many of the ease-of-use problems we encountered. Until that time, it is difficult to recommend this product over the other two.

Our testing and evaluation process leads us to recommend either Excel or Quattro Pro. Both products are easy to use, fast, and very well designed for the Windows environment.

THE SCORES

Excel for Windows Version 4.0	6.9
Quattro Pro for Windows Version 1.0	6.5
Lotus 1-2-3 for Windows Release 1.1	5.8

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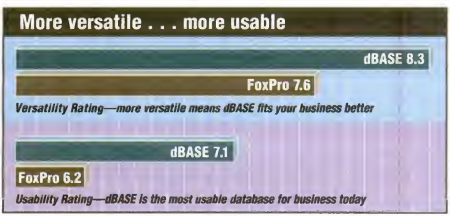

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Applying a task-oriented approach to spreadsheets

SQL-interface and logical handling of SQL code. Finally, we addressed the capability of each product to move modified data back into the SQL database.

Other features: In this category we addressed any noteworthy performance-related features we had not specifically covered in the preceding tasks. These included file compatibility, printing and preview capabilities, memory use, add-in capability, and use of Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE).

OPERATION SPEED:

We used a new suite of benchmark files that are larger and more complex than those we've used in the past to test speed. Actual performance will vary depending on the hardware configuration, amount of RAM, and size of the worksheets you use.

We used a Compaq 386/20 with 4 megabytes of memory and an 80387 math coprocessor for the operation and output benchmarks as well as for the network and SQL database access tests.

We divided our speed tests into two categories: speed of operations and speed of output (printing). Speed of operation comprised seven tests.

Financial model load and recalculation: This test worksheet contains a budget model, which is based on common financial formulas and calculates loan amortization, depreciation, and cash flow.

File load: This test involves loading the financial model (saved in each product's native file format), making a change, and then saving the file again. No disk caching was used in this test.

Recalculate all and recalculate partial: In an attempt to identify the effectiveness of a product's minimal recalculation feature, we set recalculation to automatic and recalculated the financial spreadsheet after altering a value that affects the entire spreadsheet. Then we set recalculation to manual and altered an entry that affects about 20 percent of the spreadsheet formulas and timed the recalculation again.

Engineering model recalculation: This worksheet model solves a problem in statics, an area of physics. It simulates the effect on a 100-pound block placed on an inclined plane of a variable force acting on the block from a fixed direction. The model calculates a variety of complex force and motion equations associated with the problem. We set recalculation to manual. The time we reported reflects recalculation of the entire worksheet after we change two variables.

Statistical model recalculation: This worksheet contains a database of 1,000 records, with 10 fields per record — the same file we used in our data manipulation and reporting task described above. It was developed in 1-2-3, Release 3.1+ and includes complex formulas to calculate a correlation matrix (using the @Sumproduct function) and many database @ functions to calculate frequency distributions. Recalculation is set to automatic. The score reported is the time it takes to recalculate the entire worksheet after we changed one row of data.

Consolidation and linking: In general, this two-part task involves combining the data in 15 identically formatted worksheets on a one-time-only basis. We were not interested in creating dynamic links between the sheets, but simply in rolling up the values from these regional worksheets into a single summary sheet (or file).

Part 1: Using a Lotus 1-2-3, Release 2.x macro as a common denominator for these three spreadsheets, we consolidated the data in 15 identically formatted worksheets using the File Combine Add command. We evaluated how quickly and how well each product interprets and responds to the macro commands.

Part 2: This part of the task attempted to accomplish the same type of one-time-only consolidation, but it used a solution suggested by each product's vendor. This allowed each product to apply its best technique to accomplishing the task.

In 1-2-3 for Windows, we used the File Combine Copy command to combine the files into 15 different sheets of a 3-D worksheet. We consolidated the data in a 16th sheet using @Sum formulas that spear through the sheets. Because we were able to copy the @Sum formulas quickly using a macro, we found this technique to be superior to using the SmartPak's 3-D Sum function.

In Excel, we used the Data Consolidate command to indicate the file names and range selections we wished to consolidate. Because of the one-time-only focus, we opted to have the function return values instead of linking formulas.

In Quattro Pro for Windows, we combined the 15 worksheet files into a single notebook file (WKB) and then used @Sum formulas to spear through the sheets to roll up the values.

Screen redraw: This task determines screen redraw and navigation times in the statistics worksheet. We selected a six-column range of data and created from that data a stacked bar and a pie chart. We set recalculation to automatic and used a macro to move up, down, left, and right on the screen. We timed how long it took for each program to complete the macro.

OUTPUT SPEED:

This test measures the time it takes to print the statistics worksheet from the execution of the Print command to the return of cursor control, and then to output from a QMS-PS 810 PostScript printer and an HP LaserJet Series II.

DOCUMENTATION:

Documentation scores reflect the quality and quantity of written and on-line information. A satisfactory score required complete and understandable manuals and comprehensive context sensitive help. We gave additional consideration for on-line tutorials, good examples, tip booklets, on-line help indexes, search capability, and videos.

SUPPORT:

Support is divided into two areas: support policies and technical support.

See HOW WE TEST, page 12

REPORT CARD

INFO WORLD

Windows spreadsheets

	(InfoWorld weighting)	Excel for Windows Version 4.0	Lotus 1-2-3 for Windows Version 1.1	Quattro Pro for Windows Version 1.0
Task performance				
Basic operations	(100)	Very Good	Satisfactory	Very Good
Data consolidation	(50)	Very Good	Good	Good
Data manipulation/reporting	(100)	Excellent	Satisfactory	Satisfactory
Macro/customization	(75)	Satisfactory	Satisfactory	Very Good
Text file import	(75)	Satisfactory	Satisfactory	Satisfactory
1-2-3 macro compatibility	(75)	Satisfactory	Very Good	Satisfactory
Formatting/presentation	(75)	Good	Satisfactory	Very Good
Network access	(25)	Very Good	Very Good	Very Good
SQL access	(25)	Very Good	Satisfactory	N/A
Other features	(25)	Very Good	Very Good	Very Good
Speed				
Operation	(100)	Very Good	Good	Very Good
Output	(75)	Good	Very Good	Very Good
Documentation	(50)	Very Good	Very Good	Very Good
Support				
Support policies	(25)	Good	Very Good	Very Good
Technical support	(25)	Satisfactory	Satisfactory	Satisfactory
Value	(100)	Very Good	Satisfactory	Very Good
Final scores		**6.9**	**5.8**	**6.5**

GUIDE TO REPORT CARD SCORES

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Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

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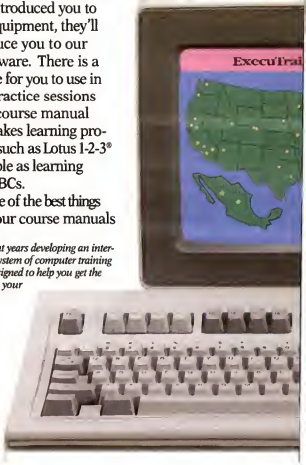

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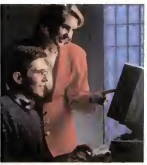

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Excel Version 4.0

Excel is the only product covered here that didn't evolve from a character-based program. Rather, it first appeared as a Macintosh application. It has changed dramatically since its introduction in 1987. The number of features has grown significantly, and overall ease of use has been improved by an order of magnitude. For sheer analytical power, this product can't be beat — thanks to its Analysis ToolPak add-in. Unlike the other two products reviewed here, Excel doesn't have a three-dimensional worksheet structure. It does, however, have an alternative: Its new Workbook feature makes it easier to work with groups of documents.

1-2-3 for Windows Version 1.1

The millions using character-based versions of 1-2-3 will find the transition to 1-2-3 for Windows particularly painless. Besides featuring a typical Windows drop-down menu interface, this product also has a "1-2-3 Classic" menu system that awakens when you press the slash key or the colon key (for WYSIWYG commands). This lets veteran 1-2-3 users whip off the command strings that have become second nature to them over the years. 1-2-3 for Windows is based on 1-2-3 for DOS, Release 3.1 and offers close to the same feature set. The SmartPak add-in does add several new features. We evaluated the product with the SmartPak add-in installed. A version of 1-2-3 for Windows 1.1 is also available on CD ROM.

Quattro Pro for Windows Version 1.0

Although Borland's DOS-based Quattro Pro has been around for years, Quattro Pro for Windows was designed from the ground up and shares no code with the DOS version. In the last moments before shipping, Borland decided to bundle the DOS and Windows products — two for the price of one.

The Windows product adds many new features, the most significant of which is an elegant notebook structure for its three-dimensional worksheet orientation. Its new "interface builder" lets you create slick interactive dialog boxes and other interface tools without extensive macro programming. The product also carries on the tradition of stellar graphics and may even substitute for a stand-alone presentation graphics package.

Summary

BASIC OPERATIONS

In basic spreadsheet operations, both Excel and Quattro Pro for Windows are far superior to 1-2-3 for Windows. Both of these products offer many shortcuts, and the products are clearly designed for ease of use for basic operations. In Excel, a right-click brings up a shortcut menu. In Quattro Pro for Windows, you get a slick dialog box that lets you adjust virtually any property of the selection.

Inserting graphs onto a worksheet is Quattro Pro's strong suit. The graphs look great, and you can change their size without affecting the aspect ratio. Embedded charts in Excel, on the other hand, are often incorrectly proportioned. 1-2-3 for Windows produces good-looking charts, but moving or resizing them on a worksheet is not at all straightforward.

All products produce good-looking output. Quattro Pro and Excel both offer page previewers in which you can adjust the margins, but only Excel's lets you adjust the column widths too. Quattro Pro's preview, on the other hand, offers an interval zooming feature that zooms the image up to 1,600 percent using the left mouse button, and zooms it back to 100 percent using the right.

PERFORMANCE: BASIC OPERATIONS

Preselecting a range for data entry in Excel lets you move down in the range just by pressing Enter. You can also define the data entry area as a database and use the Data Form command, which gives prompts and generates formulas for computed fields. You can define styles and preformat rows and columns.

Excel handles basic spreadsheet operations superbly. Right-clicking on a selection brings up a shortcut menu that quickly sends you to the desired dialog box to make adjustments. We also like its Edit Repeat command.

Updating the formulas in the summary table was straightforward. We could use either manually entered formulas or database functions. When we double-clicked a cell that had a formula, Excel automatically highlighted the cells that the formula referenced. Adding new summary data to the chart was as simple as copying the data to the clipboard and pasting it into the chart window.

The only problem we encountered was that the embedded 3-D chart appeared tiny compared to the size of the actual chart object.

Before printing, we previewed the data and were able to make minor adjustments in column widths and margins directly from the preview screen. Colors used in the formatted table did not translate properly to the black-and-white printer, but by selecting the option to ignore colors, output was fine.

Excel's main weakness is that the size and proportion of some objects are distorted when you embed a chart in a worksheet. **Score: Very Good.**

The Automatic format settings now make 1-2-3 smart enough to determine the type of data you're entering and format it accordingly. For example, it interprets 10/12/92 as a date and knows that 2nd quarter is a label even though it starts with a value.

Compared with the other products, 1-2-3's graph features are cumbersome and often nonintuitive. For example, when you create a graph, it appears in a separate window. To insert it into a worksheet, you can copy and paste from the graph window or use the Graph Add to Sheet command. To size or move it, however, you must return to the dialog box; you cannot use the mouse to drag it to a new location or resize it. The newly added range was obscured in the 3-D graph by another data range; we had to reassign the data ranges to make the range visible.

When it came time to print, we specified the print-to-fit (one-page) option, which worked correctly. However, we had to adjust some of the colors in the table so text was legible.

1-2-3 accomplished the task, but overall usability leaves much to be desired. The product lacks the shortcuts found in Excel and Quattro Pro, and we found that the menus and dialog boxes are not as well designed. You are unable to use the common shift-click method of selecting multiple ranges of data. **Score: Satisfactory.**

Data entry in Quattro Pro for Windows is straightforward. For example, you can preformat a range of cells as labels or dates. For multipage worksheets, you can designate a group of pages and enter or edit formulas across all pages in the group.

We had no difficulty updating our worksheet and creating new formulas. Adding new data to the graph was easy, and the embedded graph looked the best — by far — of any of the three products. Quattro Pro for Windows is unique in its option for specifying relative proportions for the chart: screen, free-floating, 35mm slide, or print preview. And it maintains the aspect ratio when you resize.

The shrink-to-fit option worked as expected, and the colors translated nicely to our black-and-white printer.

Quattro Pro's speedbar changes depending on what you're doing. For example, when you're editing a cell you get icons appropriate to the task. You can also add a second speedbar, either for general use or for a particular worksheet. When the mouse pointer floats over a speed button, its function is automatically displayed at the bottom of the screen — a nice touch.

Quattro Pro uses the right mouse button well to pop up a compound dialog box that lets you adjust the properties of the selected object. This feature will save countless trips to the menu. The product also features drag and drop, making it easy to copy or move cell ranges (though you can't drag a single cell). **Score: Very Good.**

DATA CONSOLIDATION

Performing the consolidation task was relatively easy using Excel's Data Consolidate command. The Data Consolidate dialog box lets you specify the ranges in the files you want to consolidate. Optionally, you can have Excel look for matching row and/or column names — which was appropriate for our sample the categories were not always in the same order. Another option lets you automatically create links to the source files and create an outline that can be collapsed or expanded. The consolidation details are stored with the worksheet, so performing the same consolidation requires virtually no setup. **Score: Very Good.**

For consolidating identically formatted worksheets, the File Combine Add command can quickly add the values from the corresponding cells in source worksheets. You can use the 3D-sum function to sum values across identically formatted sheets of a single file.

Because the data was located in different areas of the spreadsheet, we had to read each file into a separate worksheet page and then create the sum formulas manually. This took quite a while, even for our relatively small files. However, once entered, the formulas could be reused for subsequent consolidations of the same files. **Score: Good.**

For consolidating files with identical structures, Quattro Pro offers the Tool Combine command, which is similar to the File Combine commands in the DOS version of 1-2-3. The method we used took best advantage of the notebook structure; we loaded each supporting worksheet into a separate notebook page and then created formulas that acted across sheets. If the file structures are identical, you can also manually create linking formulas to the files on disk. The techniques that involve formulas allow for subsequent consolidations quickly but can make the sheet slower to recalculate. Quattro Pro for Windows can link to Excel, 1-2-3, Paradox, and dBase files. **Score: Good.**

DATA CONSOLIDATION

Excel's Data Consolidate command made it very easy to accomplish this relatively tough task, since it can consolidate data based on labels. 1-2-3 for Windows and Quattro Pro for Windows both required setting up manual formulas that worked across their 3-D worksheets. Although this approach takes longer to set up, subsequent consolidations can be accomplished quickly by simply importing the new data.

DATA MANIPULATION AND REPORTING

Excel (Continued)

Excel easily handled our relatively tough data manipulation and reporting task. It imported the dBase file directly. Before proceeding, we assigned range names to each field — a one-step process with the Formula Create Names command. It was then simple to insert formulas to calculate means, medians, and other statistics for each field. We used the Analysis Toolpak add-in to create a correlation matrix, although Excel's Corr function makes this easy to do manually.

For the crosstab table, we used the Crosstab Wizard to guide us through the steps. Although it took us two attempts to get it right, it was fairly easy and relatively fast. Unfortunately, the results of this procedure are in the form of values, not formulas. Therefore, if you make any changes to the data, the crosstab table will not be updated.

In determining the frequency distributions for the values in each field, we had three choices, use: the Crosstab Wizard, database functions, or array features. We chose the array features, combining the If and Sum functions to create dynamic formulas that are updated if data changes.

The array feature is unique to Excel and enables you to work with a group of cells much like you would work with an array of data in a programming language. You can use array formulas to create dynamic crosstab tables, automatic data rankings, and other operations that are impossible with other spreadsheets.

We awarded Excel extra points for the array feature and extensive analysis tools. **Score: Excellent.**

1-2-3 for Windows (Continued)

To get the dBase file into 1-2-3 for Windows, we had to use the separate DOS translation program to convert it to WK3 format. We then defined the range names for the data variables and used built-in @ functions to calculate the statistics. 1-2-3 lacks a function to calculate the median of a range.

We called upon the Data Distribution command to generate the frequency distributions. We had to perform this operation separately for each of the 10 variables. The command is inflexible in its placement of output and is not a dynamic operation, so if any of the data changes, you must do it all again. We could have used the @Dcount function with multiple criterion ranges. This approach will allow the distributions to recalculate when you change the data, but it is more cumbersome to set up.

We used the crosstab procedure in the SmartPak add-in to generate the crosstab table. In 1-2-3, the data to be crosstabbed must be contiguous. Therefore, we had to create a dummy column that duplicated one set of variables to get the values in a contiguous range. 1-2-3's crosstab procedure is far less flexible than the one in Excel. You are also limited to crosstabulation of two variables at a time; Excel places virtually no limit on the number of variables.

Because 1-2-3 for Windows doesn't have a specific correlation function, we created a complex formula to do these calculations and copied it throughout the database.

We were able to accomplish all components of this task except calculating the median for each variable.
Score: Satisfactory.

Quattro Pro for Windows (Continued)

We imported the dBase file into Quattro Pro without a hitch. As with 1-2-3 for Windows, we had to name the ranges manually since the automatic Range Naming command only works with single-cell ranges. We used built-in functions to compute the summary statistics (except for the median, which is not supported). The only way to calculate the median is to sort the data and then identify the value that is midway down the sorted list.

We used the Data Frequency command — which is essentially a clone of 1-2-3's Data Distribution command — to generate frequency distributions for the variables. As with 1-2-3, it's a manual operation, it's not dynamic, and you cannot specify the output range. An alternative approach is to use database @ functions with multiple criterion ranges. This product does not have a procedure to generate database crosstabs (though a user experienced in Paradox can do this using the DeskTop add-in), but we were able to use the database @Dcount function in conjunction with several criterion ranges (one for each cell in the crosstab table) to perform this part of the task. It was a rather tedious process, but once the formulas are set up, the crosstab table will recalculate automatically if any data changes. Since Quattro Pro for Windows does not have a correlation function, we also had to resort to lengthy formulas to generate the correlation matrix. It is a requirement that may be beyond the means of all but the most sophisticated user.
Score: Satisfactory.

Summary (Continued)

REPORTING

Excel took top honors in this task, thanks to its excellent selection of built-in functions, its unique array feature, and a wide variety of analytical procedures available through its Analysis Toolpak add-in. Excel's array feature adds more flexibility to analysis by letting you work with groups of cells as a unit. We used this function effectively in creating a data distribution table without resorting to a more complicated technique using database functions and multiple criteria ranges.

Both 1-2-3 for Windows and Quattro Pro for Windows provide a good selection of data analysis tools — though perhaps not enough for the most sophisticated users.

1-2-3 for Windows requires the use of a separate program to translate between the file formats it supports. In crosstabulating variables in our survey, we found the SmartPak add-in's Crosstab feature not nearly as versatile as Excel's Crosstab Wizard.

MACRO AND CUSTOMIZATION

We used the dialog box editing program included with Excel to create a custom dialog box that prompted the user to specify one of six charts and whether to view or print the chart. Developing the dialog box itself was fairly easy; we created the dialog box elements visually on-screen and then copied the entire dialog box to the clipboard. We then pasted the dialog box into a macro sheet in the form of a relatively cryptic table of data. It then required quite a bit of additional effort to write macros that acted on the information received from the dialog box.

The dialog editor is a stand-alone program, and it is clearly not up to the standards of Excel itself. For example, the right mouse button is inert, and there's no on-line help or toolbars available.

Excel's macro language also enables you to display alert boxes and change the menu system. A separate add-in provides extensive macro debugging help.

Microsoft has plans to release a new add-in program called EIS Builder that will significantly extend the capabilities of this type of interface development.
Score: Satisfactory.

The SmartPak add-in includes several new macro commands to create user interfaces suitable for the Windows environment. There's also a stand-alone dialog box editor, which we used to create a dialog box to be copied into a worksheet. We then created macros to display the dialog box and take action based on the user's response. The process wasn't difficult, but you do need to understand the cryptic format used to store dialog box specifications (which is similar to Excel's format), and you need to be familiar with macros.

The dialog box editor is ported over from Ami Pro, and we found some problems with it. Specifically, we could not change the text font, and we could not get bit maps to display.

Besides dialog boxes, the SmartPak add-in provides macro commands to display an alert box, accept a user selection from a list, and modify the menus displayed. This add-in provides much needed functionality, but it's still light years away from the customization capability in Quattro Pro for Windows.
Score: Satisfactory.

The UI Builder for creating user interfaces clearly sets Quattro Pro for Windows apart from other spreadsheets and makes it ideal for those who create spreadsheets for others to use. Using the UI Builder command, we were able to create professional-looking custom dialog boxes with features that are impossible to duplicate in either Excel's or 1-2-3's dialog box editors. It only took a few minutes to develop a dialog box to select a graph from a list. It was simple to create a macro that displays the dialog box automatically as soon as the file loads.

Creating dialog boxes and other user interface components does require some time to learn. But it lets intermediate and advanced users create sophisticated applications in a fraction of the time it would take using other products.

Our only complaint is the inability to paste macro commands into the box designed for entering code manually. We are very impressed with the UI Builder feature but still see some room for improvement in a future version.
Score: Very Good.

CUSTOMIZATION

Quattro Pro's unique UI Builder command makes it the winner in this category. It's relatively easy to create professional-looking dialog boxes that let users interact with the spreadsheet. Although you often need to use macros, Borland's approach can be a real time saver, and no other product offers this range of user-interface tools.

Excel and 1-2-3 for Windows both use a separate program to create dialog boxes, and both require extensive use of macros to link the dialog box to the worksheet.

TEXT FILE IMPORT

Excel can read any type of file. If it doesn't recognize its format, it interprets it as a text file. Importing the test ASCII file went smoothly, but the Data Parse command didn't work properly because the file contained several different line

See EXCEL, page 116

1-2-3's text file import didn't work as well as we would have liked. Our ASCII test file contained both labels and values. The Import Numbers option caused 1-2-3 to ignore all the non-numeric data. (It will bring in text if it's surrounded by

See 1-2-3, page 116

Quattro Pro for Windows successfully imported our ASCII text file, but as single-cell labels. Parsing the file into component cells required a bit of work as the file held data lines with varying formats. We had to create several format lines to

See QUATTRO PRO, page 116

TEXT FILE IMPORT

None of these products completely automated the parsing of our text file import — something we didn't really expect since the file consisted of several different line formats. Both 1-2-3 for Windows and Quattro Pro for Windows

See SUMMARY, page 116

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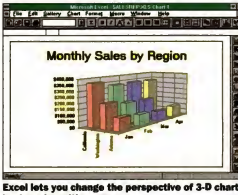
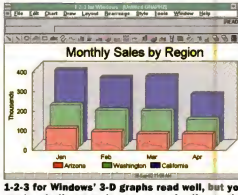
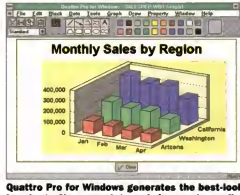
the guts.



Excel lets you change the perspective of 3-D charts by dragging with a mouse.



1-2-3 for Windows' 3-D graphs read well, but you must go to the menu to move or resize the graph.



Quattro Pro for Windows generates the best-looking charts. You can rotate and size graphs easily.

Excel *(Continued)*

TEXT FILE IMPORT

formats. The Smart Parse add-in worked a little better, but it separated each word in the labels into separate columns, which is not what we wanted.

Unlike 1-2-3 for Windows and Quattro Pro for Windows, Excel doesn't use embedded format lines to control how it parses data. Consequently, we could not manipulate the parsing format or create multiple format lines and paste them into appropriate locations in the file. Our only recourse was to perform multiple parses on each section of the file — a time-consuming and tedious chore. To its credit, Excel analyzes all of the lines in the selection (not just the first line) and usually makes a good guess about how to separate the data. Parsing text files is not one of Excel's strengths. **Score: Satisfactory.**

1-2-3 MACRO COMPATIBILITY

Excel executed our Lotus 1-2-3 word-counting macro perfectly — interpreting the 1-2-3 keystrokes and macro commands. We also tried to use Excel's stand-alone macro translation program to translate this macro into Excel's macro language. It failed miserably. The macro would not execute, and Excel inserted several warning messages into the code. The resulting macro was relatively cryptic, making it virtually impossible to correct manually. Clearly, interpreting 1-2-3 macros directly is the best approach. **Score: Satisfactory.**

FORMATTING / PRESENTATION

Excel's formatting features are terrific. You can use menus, dialog boxes (by right-clicking), icons on the toolbar, or predefined styles selected from a drop-down list. There's also an automatic table formatting command.

We formatted the table manually using right mouse button menus. Excel

1-2-3 for Windows *(Continued)*

TEXT FILE IMPORT

quotation marks.) Using the Import Text option brought the data in as long strings of text in a single column.

The Data Parse command works best with files containing fixed-length fields. Because our data had different formats throughout the file, we had to create several different format lines to match the groups of data and copy and paste them throughout the worksheet. It made completing the task rather tedious.

In addition, the sample data 1-2-3 displayed in the dialog box doesn't always match the data that you selected. 1-2-3 also generated an inaccurate error message when we tried to reparse a line of data containing only text: "parse format line can be created only for labels." We eventually completed this task, but we conclude that this process could use improvement. **Score: Satisfactory.**

1-2-3 MACRO COMPATIBILITY

Not unexpectedly, 1-2-3 for Windows handled our 1-2-3 DOS macros well by calling on the 1-2-3 Classic menu to execute the commands. It generally handles execution of 1-2-3, Release 2.x and 3.x macros with relative ease. However, 1-2-3 for Windows was clearly the least graceful of the three in how it handled user input. When the macro uses the 1-2-3 Classic command sequences, it doesn't recognize the mouse. In the word-counting task, for example, the macro pauses for you to specify a range, and you can't use the mouse to do this.

Macro compatibility is a tricky issue across Lotus' line of spreadsheets. Although 1-2-3 for Windows can handle 1-2-3 for DOS macros, it doesn't work the other way around unless your macros use only 1-2-3 Classic command sequences and only those macro commands and @ functions common to both products. Similarly, macros developed in 1-2-3 for Macintosh are compatible if you limit your keystrokes to the 1-2-3 Classic commands. **Score: Very Good.**

FORMATTING / PRESENTATION

You have access to only eight colors at a time in 1-2-3; if you want to change a color, you must do so in the palette. We had no problems formatting the table, using the menus, the SmartIcons, and the SmartPak preset formatting options.

Unlike most Windows programs we've seen, 1-2-3's dialog boxes do not show

Quattro Pro for Windows *(Continued)*

TEXT FILE IMPORT

match the different formats.

We discovered two quirks in the Data Parse command. You specify the input range and output range and then click a button to create a parse format line, which is inserted above the input range. When you click OK to parse, an error message says the input range must include the format line. You must change the original input range to include the range containing the format line before you can continue. Even more serious, however, is the kludgey technique required to edit a format line, particularly a long format line. The format line and the data do not move in sync in the edit dialog box. Without the ability to compare the format symbols with the text in a synchronized way, editing a format line, especially a long one, is nearly impossible. **Score: Satisfactory.**

1-2-3 MACRO COMPATIBILITY

Quattro Pro for Windows handled our 1-2-3 word-counting macro and the menu-driven application with no problems, although you must specify that the key reader be used. Otherwise, Quattro Pro will attempt to execute the macro using its own commands. Although this product can interpret 1-2-3 commands in macros (but only for the command set in 1-2-3, Release 2.01), it doesn't have an optional 1-2-3 command interface like the one found in the previous DOS versions of Quattro Pro (the currently shipping DOS version no longer has this feature). **Score: Satisfactory.**

FORMATTING / PRESENTATION

Those who plan to use their spreadsheet program for graphics and other types of presentations need look no further than Quattro Pro for Windows. Its graphing and customizability are without parallel and rival stand-alone presentation graphics programs.

We accomplished the table formatting

Summary *(Continued)*

TEXT FILE IMPORT

allow you to embed formatting lines in your file and then parse the data with a single command. However, we found implementation problems with both of these. Excel doesn't embed formatting lines, and you must parse files with different line formats manually.

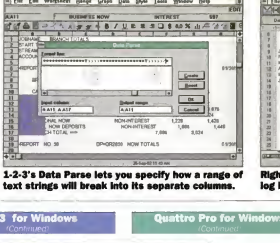
1-2-3 COMPATIBILITY

All three products can execute 1-2-3 macros directly by interpreting 1-2-3 command keystrokes and macro commands. However, Excel and Quattro Pro only handle macro commands from 1-2-3, Release 2.01. 1-2-3 for Windows can interpret commands from all versions of 1-2-3 for DOS. It can even interpret 1-2-3 for Macintosh macros that use the 1-2-3 Classic Menu command sequences. And while all products completed our tasks with no problems, we award 1-2-3 a higher score for a broader scope of compatibility.

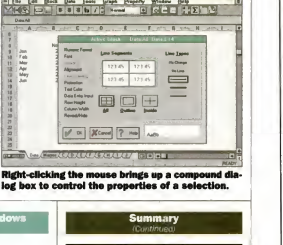
PRESENTATION

Quattro Pro for Windows is the hands-down winner when it comes to graphics. Not only do the graphs look better, it provides the best annotation capabilities and customization features. Its outstanding slide show feature beats out Excel's macro-driven add-in (1-2-3 provides no slide show capability). Excel's

The slash key brings up the 1-2-3 Classic window, which lets 1-2-3 veterans use familiar commands.



1-2-3's Data Parse lets you specify how a range of text strings will break into its separate columns.



Right-clicking the mouse brings up a compound dialog box to control the properties of a selection.

Excel (Continued)

1-2-3 for Windows (Continued)

Quattro Pro for Windows (Continued)

FORMATTING / PRESENTATION

provides a tool to create a drop shadow, but this inserts a graphic object on top of the range. The shadow doesn't move with the cell contents, even if you specify that it be in the objects properties.

Creating the combination chart was simple. We clicked noncontiguous ranges and then used the ChartWizard.

Excel doesn't have a command to import graphic files, so we had to use Windows Paintbrush to copy and paste in the PCX file. You can also use Edit Insert Object, which will allow you to imbed an object from any Object Linking and Embedding (OLE) server.

Excel doesn't have a text-only chart format, but you can accomplish the same effect by creating a chart with no data selected. This gives you a blank chart window in which you can add text. Since you cannot underline text, we added a line object to underscore the title. Excel doesn't allow multiple selections in chart windows, so we formatted one bulleted item and used the Edit Repeat command to quickly format the others. Getting bullets was a chore. We tried using the Windows Character Map application to paste a Wingding character but discovered Excel did not paste the proper font. We had to change the font manually and then use the Edit Repeat command. Aligning the bullets horizontally was even more challenging since there is no Snap-to-Grid feature. When we pasted the text chart into the worksheet, it looked terrible since scaling of graphic elements is not consistent.

Creating the diagram on the worksheet was easy using Excel's free floating text box objects.

Besides all the normal alignment, font, text color, and background formatting tools, Excel can vertically align text within a cell. Excel's numerical formatting capability offers a good assortment of predefined formats, and you can create your own formats.

The only significant weakness we found was in manipulating text in chart windows. As we noted, the normal Copy and Paste commands do not work in chart windows, and it would be helpful to provide a grid for aligning objects.

Score: Good.

the current settings. For example, if the format for the selection is Helvetica bold, the Style Font dialog box doesn't show it.

Creating the graph required extra steps since the data we wished to graph was not contiguous. We had to specify the ranges manually instead of being able to use the automatic graphing feature. You must also specify the legend text separately from the data, but you can specify all the legends in one step by identifying a legend range. Finally, you cannot adjust the width of lines in a line graph.

Adding simple annotations revealed several other limitations. Added text cannot wrap around, so we needed two text boxes for our two-line comment. However, you can rotate the single-line text boxes to any angle. Adding an arrow was easy using a smart icon. Once the arrow was added, we could move it, but we had to go to the menu to change its size and orientation. 1-2-3 for Windows can import CGM and PIC format graphics files, but you can add other types of graphics files from the Windows clipboard.

Creating the text-only graph was difficult, as text objects are limited to a single line and you can't change the fonts from within a graph window. For example, if you want to use the Wingdings font, you must exit the graph window, replace one of the existing fonts with Wingdings, and then return to the graph window. There is also no copy-and-paste capability within a graph window.

Unlike Excel, 1-2-3 doesn't have a separate draw layer on the spreadsheet. To create a drawing, you must create a blank graph first and then draw on it. (The drawing tools are similar to those in Lotus Freelance.) When you add the graph onto the worksheet, the graph objects may appear disproportionate, depending on the range you choose. For example, you may create a circle in the graph window, but it appears as an ellipse when you add it to the worksheet. You must resize the range or re-enter the graph environment to make changes. It is a matter of trial and error to get the objects to appear correctly.

If you're moving from 1-2-3 for DOS, you might find many of 1-2-3 for Windows' features familiar, but when you compare it with Excel or Quattro Pro, the graphing features are generally harder to access and also more limited.

Score: Satisfactory.

See 1-2-3, page 120

task with ease, and quickly realized how efficient the right mouse button can be for routine formatting chores. A quick click brings the formatting dialog box right to your pointer. Annotating the chart was equally easy. We used the speedbar to add the text and arrow and then quickly adjusted the properties using right-click convenience.

Support for graphic file formats is outstanding and unmatched by any other spreadsheet. Quattro Pro for Windows can directly import and export BMP, EPS, CGM, PCX, GIF, and TIF files. However, we were confused about how this program handles colors. Some of the 256-color images that we imported appeared to have been reduced to 16 colors in Quattro Pro for Windows (including our test PCX file). Other 256-color images were imported perfectly. A Borland representative explained that Quattro Pro for Windows adjusts the palette for the best overall results when multiple images are displayed. In fact, we found that this method avoids the problem we've found in Excel and 1-2-3 for Windows in which importing a second 256-color image completely messes up the palette for the first image. Quattro Pro appears to have implemented a compromise that displays all images satisfactorily, albeit not always at their original resolution.

Producing the text-only chart was very easy, thanks to the rich drawing and graphics tools provided, including a set of alignment commands and a snap-to-grid feature. We started with an empty graph window, created the drawing, and then pasted it into the worksheet, where it could be sized and moved freely. Drawing the diagram was painless. Importantly, embedded charts can be resized on a worksheet and still look good. Quattro Pro for Windows goes the extra distance to maintain the image's aspect ratio and adjusts image text size and positioning to keep it readable.

This product has dozens of small features that, together, make it the best product for producing graphs from spreadsheet data. Perhaps the only limitations in the area of formatting are that, unlike in Excel, you can't align text vertically in a cell, nor can you center a label over multiple columns.

Score: Very Good.

See QUATTRO PRO, page 120

Summary (Continued)

PRESENTATION

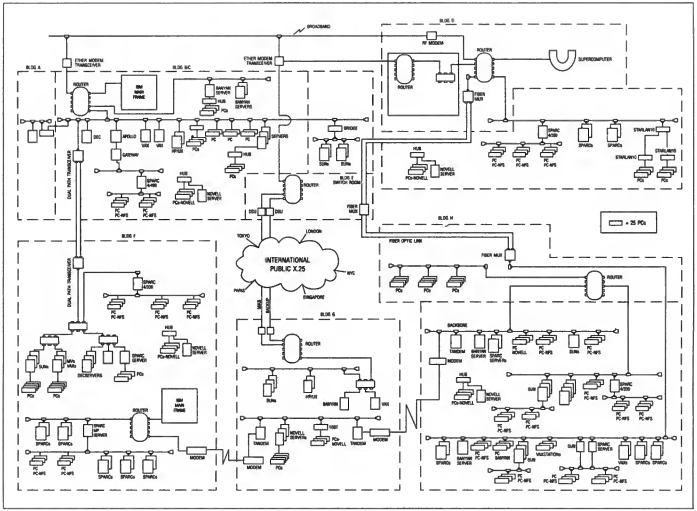
charts look great when displayed in separate windows, but when you insert them into a worksheet they can look terrible and often require manual adjustment.

Both Quattro Pro for Windows and Excel for Windows make it very easy to format your worksheets. In both products, a right mouse click leads you quickly to the commands you need to change formats. Excel pops up a short menu, Quattro Pro cleverly takes you directly to a dialog box with all the formatting options right there.

1-2-3 for Windows, on the other hand, suffers from a relatively poor design in this area, making it much more difficult than necessary to change fonts, apply colors, borders, and other formatting touches. The SmartPak does add a Smart format feature but there is no right-mouse click shortcuts to implement the formats.

See SUMMARY, page 120

Perception.



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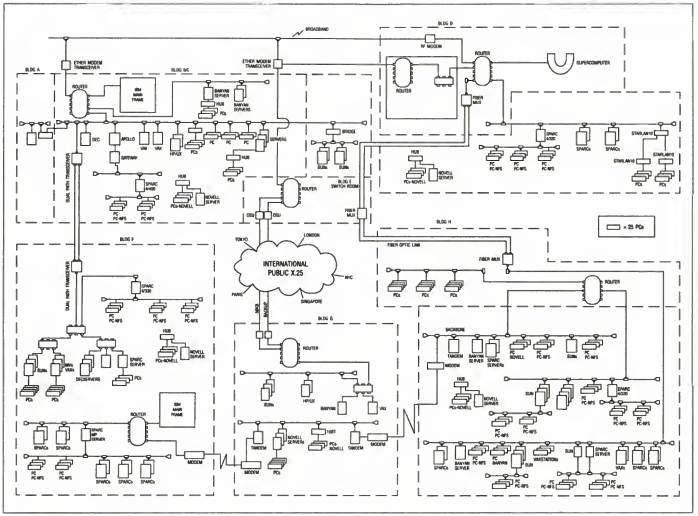
Reality.



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Excel
(Continued)

NETWORK ACCESS

You can install the stand-alone version of Excel on the network server, and multiple users will be able to use the program files without built-in restrictions, although the Microsoft licensing agreement only permits one user per package at a time. Once you have the initial package, which retails for $495, there are $395 packages for each additional user on your network. However, it is up to your network adminstrator (or IS manager) to make sure that there are enough licensed copies of the software to cover the number of users using Excel simultaneously.

If you open a file that is in use, Excel opens the file in read-only mode. Only the user who has the file reservation can make changes to the original file name.

The program provides the same type of file reservation protection whether multiple users are all using the same program files from the server or copies of the program files from their own workstations.

Multiple users are able to run the same macro from the server, and you can assign passwords to data files for security. **Score: Very Good.**

SQL ACCESS

Excel for Windows' Q+E add-in offered easy access to our SQL Server. Q+E can access three SQL client/server databases: Microsoft/Sybase SQL Server, Oracle, and DEC RDB.

Loading a entire database table or a portion of it was an intuitive process and we had no trouble writing queries. Q+E can calculate column totals, minima, maxima, counts, and averages. Q+E provides a SQL option window for inputting SQL commands. You can define a new database or table as well. There are 17 different data types, and using the Copy Special command you can link data from a table, or from formulas, and copy column headings and record numbers. When you change data in Q+E or Excel, those changes are automatically made to the SQL Server database. **Score: Very Good.**

OTHER FEATURES

All versions of Excel use the same file extension, which can be confusing. The files are upwardly compatible. Excel can also read and write Lotus WK1 and WK3 files (including formatting files), dBase, DIF, text files, and comma-separated variable (CSV) text files.

Like Lotus 1-2-3 for Windows, Excel supports add-ins to extend the functionality of the program. A good example is the solver feature, which is unique in allowing you to specify an integer solution to a problem. Excel also supports Dynamic Data Exchange (DDE) and OLE as both a client and a server.

Excel has a built-in spelling checker and can share its dictionary with other Windows products.

Excel's workbook feature is an improvement, but it's still not 3-D. **Score: Very Good.**

See EXCEL, page 124

1-2-3 for Windows
(Continued)

NETWORK ACCESS

We could load the stand-alone version of 1-2-3, installed on a server, from one workstation after copying 123W.INI to the workstation's home directory. We were unable to load the program from the second workstation; 1-2-3 correctly indicated that the program files were already in use. (Licensing permits only one user to load the program at a time). Lotus offers server and node versions.

We then loaded stand-alone packages on each workstation. At the first workstation we retrieved a worksheet file and were given the reservation (the right to save changes to the file). At the second workstation, we were able to retrieve the worksheet in read-only mode; we (correctly) could only save changes to a different file name. The messages 1-2-3 generated were appropriate and informative.

We were able to run a macro stored on the server from different workstations; but only one workstation had the read-write privileges. 1-2-3 issued appropriate messages. You can password-protect data files. **Score: Very Good.**

SQL ACCESS

Attempting to access a SQL database in 1-2-3 for Windows is not for the faint of heart. The interface is hardly intuitive and the documentation was of little help; context sensitive help was much better.

We used the Connect to External command to log into the server. We entered the user name and password, indicated the name of the database and the table we wanted to use, and attempted to conduct several queries. We were able, through trial and error, to query the database and even produce an aggregate column. We modified several records and sucessfully sent the data back to the server using the Data Query Modify Insert command.

The 1-2-3 for Windows DataLens driver (their database translation program) supports dBase III and IV, Paradox, and SQL Server. Other database drivers are available from Lotus upon request. These include Oracle, OS/2 Data Manager, RBase, and dBase II. **Score: Satisfactory.**

OTHER FEATURES

1-2-3 for Windows' three-dimensional worksheet structure, while convenient, is less so than Quattro Pro for Windows' 3-D design — you must manually insert additional pages, and you can only view three at a time in a perspective mode.

1-2-3 does include a powerful solver feature for both linear and nonlinear optimization problems. 1-2-3 also bundles the Adobe Type Manager and supports add-ins and dozens of third-party products that extend product functionality.

1-2-3 for Windows supports Dynamic Data Exchange (DDE) as both a client and a server, but offers no support for Object Linking and Embedding (OLE).

We award points for the solver, ATM, and third-party add-in support, but subtract points for lack of OLE support. **Score: Very Good.**

See 1-2-3, page 124

Quattro Pro for Windows
(Continued)

NETWORK ACCESS

It is possible to install the stand-alone version of Quattro Pro for Windows on the network server and have multiple users access the program files simultaneously, though legally the program is licensed for use by only one user at a time. Borland does make license packs for each additional user available for $395. (According to a Borland representative, there is currently no defined policy restricting multiple users of the program on a server, nor is there an actual server version of the software.)

We were able to access the same worksheet from two different workstations. However, the second workstation could only retrieve the file in read-only mode. A unique Quattro Pro feature tells the second user not only that the file is in use but who has the reservation on the file.

Multiple users can run a simple macro (data fill/cell format) located on the server at the same time; only one will have read-write privileges. For greater security, you can password-protect data files. **Score: Very Good.**

SQL ACCESS

Quattro Pro for Windows ships with Database Desktop, an interface to an underlying database management engine. This allows access to dBase and Paradox databases with true concurrent database access capabilities. The Database Desktop implements Paradox-style QBE (query-by-example) which would make completing this task easy — but they do not offer SQL support. **Score: N/A.**

OTHER FEATURES

Quattro Pro for Windows is peerless when it comes to working with groups of worksheets. The tabs that appear at the bottom of the screen make it easy to traverse notebook pages; just click. You can develop a page from within the notebook or bring it in as stand-alone spreadsheets from 1-2-3, Excel, or Quattro Pro for DOS. You can name pages and use those names in formulas. You can define multiple groups of pages in a notebook file as long as they don't overlap, and then format or create formulas by group. Another great feature is the "model copy" command that's designed for working with multiple what-if scenarios. Quattro Pro supports DDE and OLE, but only as a client for other OLE server applications. **Score: Very Good.**

See QUATTRO PRO, page 124

Summary
(Continued)

NETWORK ACCESS

All three products allow access over a network. Neither Borland nor Microsoft has barriers preventing more than one user from loading the program from the server, though their written policy is clear: one user, one package. Lotus, whose copy-protection history is legendary, remains true to form. Only one user at a time can access the stand-alone version of 1-2-3 for Windows on the server. There is a network version that allows multiuser access.

Multiple users can access data files on the server in all three products, each controlling write-access of files to one user at a time. If you are the second user to load a file, only Quattro Pro for Windows tells you who has read-write access.

All three products allow multiple users to run a macro simultaneously and to password-protect files.

SQL ACCESS

Excel was by far the winner in terms of ease of use. Q+E made the whole operation quite manageable. 1-2-3 for Windows was another story. The interface is not intuitive and the documentation is not much help in deciphering the proper steps. Quattro Pro was out of the running in this category, as it does not offer SQL Server Access.

OTHER FEATURES

The products are all rich in features; some they have in common, others are unique. All three products offer a solver feature for linear and nonlinear optimization problems. Excel's implementation is preferable, since you can specify an integer solution. Both Excel and 1-2-3 for Windows have a feature that lets you attach add-ins for additional functionality.

Only 1-2-3 for Windows offers both Paradox and SQL database drivers (though external database ease of use — at least as far as the SQL interface is concerned — could use some work). Excel is unique in its possession of spell-checking.

Quattro Pro has the Model Copy command that takes a good bit of the work out of recreating a model for various what-if scenarios

See SUMMARY, page 124

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SPEED: OPERATIONS

Excel

Excel did excel in most of the recalculation exercises. Strangely, the program required as much time to recalculate a part of the financial model as to recalculate the entire file. Microsoft had no real explanation. It beat out 1-2-3 by a nose in consolidating in 1-2-3 mode using the 1-2-3, Release 2.x macro. However, in native-mode consolidation, it squarely beat the competition. Screen redraw was faster than 1-2-3 but not up to speed with Quattro Pro. **Score: Very Good.**

1-2-3 for Windows (Continued)

1-2-3 for Windows required less disk space than the other products to store the financial model, but it took a bit longer to load it into memory than Excel did. 1-2-3 was generally competitive in its operating performance in most areas. It dallied in screen redraw and lagged in statistical recalc and native-mode consolidation. **Score: Good.**

Quattro Pro for Windows (Continued)

Quattro Pro for Windows was generally a smooth operator. However, initial file load lagged a bit, and engineering-model recalc time was twice 1-2-3's and four times Excel's due to the large number of @IF functions, which Borland acknowledged are relatively slow to evaluate in Quattro Pro. Consolidating in 1-2-3 mode took more than twice the time of the others. **Score: Very Good.**

Summary (Continued)

Excel demonstrates the fastest speeds in all but two recalc categories and screen redraw. Quattro Pro's screen redraw was fast, as was recalc of the financial and statistical models. Recalc on the engineering model lagged due to slow handling of @IF statements. 1-2-3's native-mode consolidation was considerably slower than the others'.

1-2-3 for Windows is quickest at partial recalc of the financial model, but it generally lolled a bit behind the others.

OUTPUT

Excel for Windows' printing performance on the QMS PostScript printer was a shocker, due to the default automatic color-selection feature and slow printing to PostScript printers. To print faster you can use the custom (manual) color selection option, which reduces print time considerably. Excel printed much faster to the HP LaserJet Series II.

The custom color selection option and the fast HP LaserJet print speed mitigate the horrendous PostScript auto-color-selection performance. However, the automatic color selection routine produces much sharper output than the other products — custom color selection produces output equivalent in quality to the other products. **Score: Good.**

1-2-3 for Windows performed admirably on print tests to both the HP LaserJet Series II and to the QMS PostScript printer, beating out both competitors. 1-2-3 printed the stacked bar chart with relative clarity; however, the pie charts were small and the range labels were too tiny to read. 1-2-3's PostScript text output was identical in quality to the other products; however, it scaled the fonts better when fitting the data to single-page output. **Score: Very Good.**

Quattro Pro for Windows performed slightly better than the others on both the LaserJet and QMS printers. Though the initial download to the printer took a bit longer on the LaserJet, output appeared in about the same time as on the PostScript printer. Quattro Pro was the only one of the three products to produce clearly readable labels on the bar and pie charts, and it correctly hid text under a graph in a print range with overlapping text and graphics. **Score: Very Good.**

Both graphic and text output was better on the QMS-PS 810 PostScript printer than on the HP LaserJet Series II. Quattro Pro produced consistent, more legible output on both printers. Excel took 30-plus minutes to produce the graph/text printout on the PostScript printer due to its automatic color feature, which assigns unique colors or gray-scale shades to graph colors and sends a bit-map image to the printer. The output is of higher quality. With the custom (manual) color selection you can produce standard-quality printouts on a PostScript printer in less than 2 minutes. Only Quattro Pro correctly hid overlapping text behind a graph using default settings.

DOCUMENTATION

Excel for Windows comes with a two-volume users' guide, divided into basic and advanced topics, plus a comprehensive function reference book, a guide to the Q+E database program, a quick-reference booklet for the toolbars, and a 40-page guide for Lotus 1-2-3 users. The manuals cover both the Windows and Macintosh versions of Excel.

Excel has extensive on-line help, though it doesn't include macro functions. **Score: Very Good.**

1-2-3 for Windows ships with a users' and upgraders' manual, getting-started and solver booklets, DataLens driver and ATM guides, and a SmartIcon quick-reference card. The on-line help is thorough and substitutes for a reference manual. We found documentation of certain advanced topics lacking.

There is also a CD ROM version of 1-2-3 for Windows, which offers electronic documentation, plus animated "movie" tutorials. **Score: Very Good.**

Quattro Pro for Windows includes three paperback books: a getting-started manual; a users' guide; a book devoted to @ functions, macros, and topics of interest to application developers; and the database DeskTop guide. There is also a spiral-bound quick-reference guide and extensive on-line help. Sample notebook files were helpful. We found the manuals to be thorough and the on-line help complete and easy to traverse. **Score: Very Good.**

We found these products to be well documented. 1-2-3 for Windows lacks a reference manual but provides this information in the form of an unusually thorough on-line help system.

SUPPORT POLICIES

Telephone support is available weekdays from 6 a.m. to 6 p.m., Pacific time. Microsoft also provides a 24-hour-a-day automated interactive voice support system for selected topics, support via CompuServe, and a special line for the hearing impaired. **Score: Good.**

Lotus provides toll-free technical support for six months, and the department is staffed 24 hours a day, seven days a week. You can purchase additional technical support or use the non-toll-free 900-line service. Support is also available via fax, a 24-hour fax-back system, or CompuServe. **Score: Very Good.**

Standard non-toll-free telephone support runs between 6 a.m. and 5 p.m., Pacific time, Monday through Friday. There are also 24-hour prerecorded answers to commonly asked questions and a fax service, as well as a BBS and support through CompuServe, GEnie, or BIX. **Score: Very Good.**

The three top spreadsheet makers have caught on to what the industry is looking for in terms of service options. All have fax and bulletin board support and extended hours. Lotus' and Borland's policies are a cut above.

TECHNICAL SUPPORT

We got through immediately on both of our calls to Microsoft and spent a short time on hold. We had mixed results. On the first call, the technician was very responsive and eager to help. The second technician we spoke with answered our questions but appeared rather distracted. **Score: Satisfactory.**

Generally, we found getting through to support the toughest part; it was always busy. When we got through, we waited on hold for a few minutes. We found the support to be adequate, although the technician did not seem to thoroughly understand the more advanced aspects of the product. **Score: Satisfactory.**

Busy signals were the order of the day in our attempts to reach Borland. Once connected, however, we spent less than 5 minutes on hold. In both cases, we found the support technicians to be very friendly and knowledgeable about the product. **Score: Satisfactory.**

Intent to provide access to high-quality service is evident among these industry giants, as their support policies show. Yet none delivered entirely on that intention. Service varied from sufficient to inspired, but in each case, our ability to access the service seemed to offset the quality.

VALUE

Excel for Windows is the most feature-rich product for analysis and is strong in overall ease of use. Importantly, the Macintosh version is nearly identical in features and user interface — making it particularly appropriate for mixed-platform offices. If you purchased Excel 3.0 after February 15, you can upgrade to Version 4.0 at no cost. Otherwise upgrades are $129. **Score: Very Good.**

Lotus recently reduced the price of 1-2-3 for Windows to $495. There is also a competitive upgrade policy and significant discounts if you purchase the product as part of Lotus' Smart Suite, which includes Ami Pro, Freelance Graphics, cc:Mail, and Organizer ($795 new, $595 upgrade). We find both Excel and Quattro Pro for Windows easier to use and more capable. **Score: Satisfactory.**

Quattro Pro's list price is $495 ($99.95 for users of competing spreadsheets), which includes the DOS and Windows versions. Upgrades are $79.95 through year end ($99.95 thereafter). Quattro Pro for Windows is an impressive product that makes good use of Windows. It does lack SQL access. It is a terrific value for both beginners and advanced users. **Score: Very Good.**

Quattro Pro for Windows and Excel are both truly great values. Base your buying decision on what you want the product to do for you. Excel provides number crunchers all the analytical muscle they need. For graphics aficionados and application builders, Quattro Pro is outstanding. It's difficult to recommend 1-2-3 for Windows except to the most devout 1-2-3 user moving to Windows.

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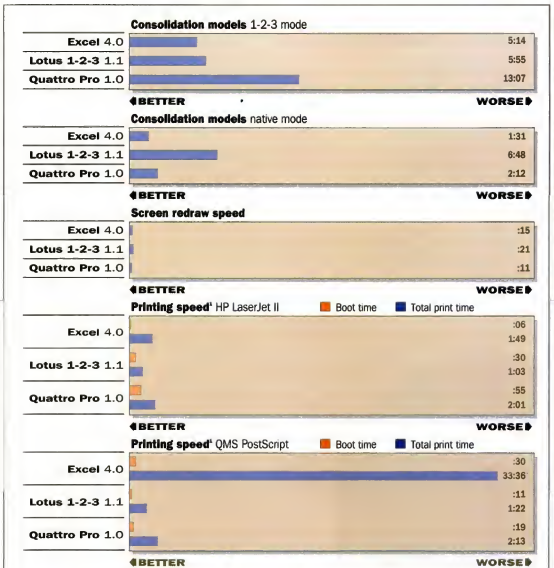
BENCHMARKS

INFO WORLD

Windows spreadsheets



[1]For print speed benchmarks, the orange bar indicates when the print notification box disappears from the screen; the blue bar represents the time for the output to emerge from the printer.

[2]Excel is optimized to work well with a PCL-type printer. All colors in the graph are selected by the program automatically to guarantee that when the printout comes out the shades of gray are all different. Excel accomplishes this by sending a bit map to the printer. Because we are printing to a PostScript printer, there is a lot of code generated. When we took the same graph and changed the color selection from automatic to custom, the time to get the printout was 13 seconds to boot and 1:45 for total print, which is very competitive with other applications under test. Quality of the output is much better than other applications' printouts when left in auto-color mode.

	Excel Version 4.0	Lotus 1-2-3 Version 1.1	Quattro Pro Version 1.0
Financial model			
File size	316978	243982	293550
File load[1]	10.2	14.6	16.32-20.9
Recalc all	4.1	4.4	0-3.15
Recalc partial	4.6	1.9	1.6
Engineering model			
Recalc	11.1	19.6	45.7[4]
Statistical model			
Recalc	1:6.4	2:7.9	22.5-46.8

Tests performed on a Compaq Deskpro 386/20e with 4 megabytes of RAM, 80387-20 coprocessor, a 110-megabyte hard drive prepared with Compaq DOS 5.0.
Times reported as a range (0.0—0.0) indicate that background recalculation took place. The first number indicates wait time for return of cursor control; the second number indicates when the entire spreadsheet appeared to be recalculated.

[1] Load time includes recalculation time.
[4]Quattro Pro Engineering Recalc times). Our engineering model contains many @IF functions. According to Borland, Quattro Pro evaluates @IF functions more slowly then other functions, resulting in the high recalculation times.

HOW WE TEST / from page 108

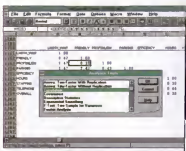
Task-oriented approach

Support policies: In scoring support policies, we awarded a satisfactory score if the vendor provides unlimited free (but not toll-free) technical support during standard business hours. We awarded bonus points for toll-free lines, fax and bulletin-board support, extended hours, usability warranties, money-back guarantees, and corporate extended support. We subtracted points when vendors provided no or limited technical support.

Technical support: Technical support scores were based on the quality of service we received when we successfully completed at least two anonymous calls to the vendor and the availability of knowledgeable technicians.

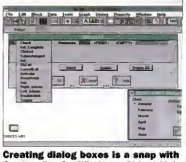
We awarded a score of satisfactory for professional demeanor and correct answers to our questions. We gave bonus points for a proactive approach by the technician. We subtracted points for unusually long waits on hold, unprofesional service, or incomplete answers.

VALUE:
The score in this category reflected the products' overall price vs. performance. We judged this against the retail price of competitive products, as well as considering upgrade costs, network costs, and any other issues related to pricing.



Excel's Analysis ToolPak provides a rich set of advanced analytical tools unmatched in any other product.

Excel's Crosstab Wizard guides you through simple or complex cross-tabulations using a database.



Creating dialog boxes is a snap with Quattro Pro for Windows. Object Linking controls each element's function.

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Peel away the hype. Look for the smartest features and the best-quality components at the core of the system. Compare company strength and reputation for the best, most honest service. And look for the extra, more-for-your-money trimmings from one company that just might upset another's applecart.

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REVIEWS

XTree for Windows looks good, runs slow

Popular file DOS management utility loses a few valuable features in port to Windows

By Patrick Marshall
Contributing Editor

The first thing fans of XTree Gold should know before cracking open the new XTree for Windows is that about the only similarity between the two programs is the packaging. XTree for Windows is one of the best file managers available for Windows, but longtime users of the DOS program will not recognize much about the Windows version.

Indeed, XTree for Windows has more of the look and feel of Symantec's Norton Desktop for Windows and Windows' File Manager than it does of XTree Gold; this is both good and bad. On the positive side, you can see a lot more on-screen with Windows' graphical interface than with XTree Gold's DOS screen, and many users will find the new drag-and-drop capabilities very handy.

On the down side, XTree for Windows lacks the DOS version's simplicity and speed. Where XTree Gold's screen is primarily unchanging, XTree for Windows lets you customize to such an extent that many users will feel burdened by all the decisions they need to make. And many users — even those who are extremely comfortable with Windows' mouse commands — will miss XTree Gold's simple, fast, and efficient key commands.

But a far more serious problem is XTree for Windows' pokey performance. The program takes 10 seconds to load, more than three times longer than either Norton Desktop's or Windows' own file managers. XTree Gold took only 2.6 seconds on our 33-MHz 486 test platform.

Overall, XTree for Windows represents the strongest set of file management tools available for Windows. The program includes more than 50 file viewers and built-in PKZip archiving — a feature missing in both Norton Desktop's and Windows' file managers.

We evaluated XTree for Windows 1.0 with criteria from our comparision of Windows file managers of May 20, 1991 (page S85).

REPORT CARD INFO WORLD

WINDOWS FILE MANAGER

XTree for Windows

VERSION 1.0

Criterion	(Weighting)	Score
Performance	(400)	Very Good
Documentation	(75)	Very Good
Ease of use	(250)	Good
Support policies	(50)	Very Good
Technical support	(50)	Satisfactory
Value	(175)	Good
Final score		**6.8**

PRODUCT SUMMARY

Company: XTree Co., in San Luis Obispo, Calif., can be reached at (805) 541-0604.
List price: $99.
Requires: IBM AT, PS/2, or compatible; 2 megabytes of RAM; 2.2 megabytes of disk space minimum; DOS 3.3 or later; Windows 3.0 or later.
Pros: Strong file management tools; drag-and-drop PKZip file compression; broad selection of file viewers.
Cons: Slow performer; poor memory handling; no unerase utility.
Summary: XTree for Windows is arguably the strongest all-around file manager for Windows, but it's not as elegant or easy to use as its DOS predecessor, XTree Gold.

Features:

Although XTree Gold aficionados will find little recognizable in XTree for Windows, Windows users will feel right at home. A directory tree fills the left panel of the program's display, and subdirectories and files appear in the right panel. View panels for displaying file contents are located underneath the tree and file panels. A button bar with eight icons for copying, moving, deleting, extracting, viewing, and marking files resides above the panels. You can access other functions, such as opening an Auto View window or creating a new directory, via pull-down menus.

You can change XTree for Windows' displays in two ways. You can resize any of the panels to allow more room for displaying file contents or for listing files. And you can save the new configuration so that it will be the same the next time you load the program. You can also switch from the Standard layout to the Auto View layout, which is composed of two panels — a file panel on the left and a view panel on the right. The Auto View layout allows you to see much more of a file's contents at a glance than the Standard layout allows.

XTree for Windows provides just about every file-management tool a user could want, including the capability to tag files for mass operations, move files and directories across drives, and view and launch files.

Two features in particular distinguish XTree for Windows from its competition: its file compression capabilities and XTreeLink, a built-in utility for transferring files between two computers connected with either a serial or parallel cable.

Performance:

XTree for Windows covers all the bases of basic file management and provides some high-powered extras as well. You can, of course, copy, delete, rename selected files, and move files across directories or drives. You can also perform these same operations on entire directories or sets of directories.

Finding the files you want to work with is also easy. The Find command lets you use wildcards to search for files, and you can filter directories to show only the file types you want to see, such as EXE or DOC files. You can sort files by any of several criteria, including file size, date, name, and extension. Unlike Norton Desktop, you cannot search for files containing a specified character string; however, you can search the file you're currently viewing for a character string.

XTree for Windows also lets you change the "scope" of the directories and/or drives with which you're dealing, much like hoisting a portion of an outline in an outlining program. If you select only drives C, E, and F, for example, that's all you'll see in the tree window, and operations will be performed only on those drives until you change scope again. XTree even includes a six-button bar with which to expand or collapse the tree to the level desired.

XTree for Windows also offers an adjustable global view of files. By opening combined volumes and directories windows, you can collect all files in selected directories and view them as if they were in a single directory.

The most unique feature of this program's file handling is its support for PKZip file compression. Just having the capability to zip and unzip files is unique among Windows file managers. But XTree has taken an unusual approach to the archiving process. It treats zip archives as separate volumes and lists them in the tree pane right alongside your disk drives. If you select an archive volume, the program will display its files, just as with any other directory. If you copy a file from an archive to another directory, XTree will automatically unzip it in the process. Dragging a file from a regular directory to a zipped volume compresses the file and adds it to the archive.

The Auto View display has a file panel on the left and a view panel on the right. It allows you to see much more of a file's contents than the Standard layout.

One special feature in XTree for Windows is the capability to display the contents of zipped files without first having to unzip the files. You can use the viewer either on-call, to view files individually, or you can open an Auto View mode, where highlighting a file displays its contents in the Viewer window.

Only two file management features are notably absent. Whereas XTree Gold includes an Unerase feature and lets you edit files, the Windows version does not. You can, however, launch files in their parent applications from the Windows program, but there may be times when you'd rather call up a Word for Windows file, for example, in an ASCII editor.

XTree for Windows offers the broadest range of file viewers of any Windows file manager. It supports 33 word processor formats, including all major Windows and DOS programs. XTree's support of spreadsheet and database formats, though, is somewhat meager, including just Excel, Lotus, Quattro, Quattro Pro, dBase III and IV, Paradox 3.5, and FoxPro.

When it comes to graphic files, however, XTree for Windows provides broad support. The program can handle 13 different formats, including TIF, PCX, BMP, and a selection of vector formats. The one notable missing file format — and it's one that is becoming increasingly popular among those dealing with raster images — is JPEG.

XTree for Windows includes a separate file-transfer program, XTreeLink. With a serial or parallel cable (not supplied) and either XTree for Windows or XTree Gold, you can access a remote unit's drives from a host computer for

file transfers in either direction.

XTreeLink has a few drawbacks. You can only operate the program from the host computer, not from the remote unit. And although you can access the remote computer's drives directly from XTree for Windows, you must first activate XTreeLink from the DOS command line before loading Windows.

In short, XTreeLink is not a leader in the file-transfer category. In addition, the program lacks the advanced features found in LapLink Pro, such as directory synchronization and batch files. Still, XTreeLink is a handy addition to a strong file management package.

We rate performance very good.

DOCUMENTATION:

XTree for Windows' manual is concise and to the point. You'll find the explanations generally easy to follow and the illustrations ample. The manual is well indexed and includes a section advising XTree Gold users on the differences between it and XTree for Windows. There is also a slim manual for XTreeLink.

The searchable on-line help is also thorough and includes many more illustrations than is usual for on-line help.

XTree for Windows does not include a quick-reference card, quick-start guide, or any other documentation, but users won't need it.

Documentation is very good.

EASE OF USE:

Although there is no tutorial, you'll find XTree for Windows, for the most part, intuitively designed and its functions very easy to grasp. And the manual's section comparing the DOS and Windows versions of XTree smoothes the transition.

There are a number of features that help ease your file management chores. For example, XTree for Windows' drag-and-drop capabilities make copying and archiving files a breeze. Copying a select file or group of files to a different directory is as simple as highlighting them, then dragging them with a mouse to a new directory.

You're also likely to prefer XTree's new method of handling zip files to the old-fashioned way employed by XTree Gold. However, you may find XTree for Windows' unusual practice of treating compression procedures as a matter of copying files to archive directories confusing at first. There is no indication that you're actually compressing files, so new users may not be certain at first that they're doing things correctly.

The way XTree for Windows displays directories may take some getting used to. Double-clicking on a directory adds a new pane without eliminating the previous displays. You can prevent the directory windows from piling up by selecting Auto Directory or by double-clicking the right mouse button.

Unfortunately, using Auto Directory challenges your old habits, and learning new ones can take a bit of getting used to. For example, whereas in XTree for DOS you select a directory with a double mouse click, the Windows version only requires a single click. If you click your mouse twice, you'll open a new directory window.

Although Windows is designed to be used with a mouse, some things about file management are better suited for keyboard commands. XTree Gold's method of cursoring to a file and pressing "V" for View, for example, is less complicated than clicking on the file and then looking for the View icon in the menu bar and dragging the file to it.

Similarly, whereas XTree for Windows is more flexible in providing global views of files, the process of getting to a global view is more difficult and harder to remember than in XTree Gold, where you simply enter a file specification and press "G" for Global.

The most serious ease-of-use problem is clearly the program's lack of speed. Many users will not tolerate a 10-second delay on a 486/33 when launching the program. In addition, when trying to view a formatted text file, XTree often pauses for as long as 1½ seconds; XTree Gold never kept you waiting more than half a second.

We rate ease of use good.

SUPPORT:

Support policies: XTree offers a 60-day money-back guarantee. Support is unlimited but not toll-free from 6 a.m. to 5 p.m. weekdays, Pacific time. There is also a CompuServe forum, private BBS, and fax support. Support policies are very good.

Technical support: When calling XTree's technical support, we were on hold for no longer than 3 minutes. We found the staff to have good command of the program and be eager to help. Technical support is satisfactory.

VALUE:

XTree for Windows is a very capable file manager that is, overall, very nicely adapted to the Windows environment. It does, though, lack some of the DOS version's important capabilities, such as an unerase utility and an ASCII editor — features included in Norton Desktop for Windows. But XTree for Windows offers a couple features not found in any file manager, namely built-in file compression and an unusually broad selection of file viewers.

In addition, the program is relatively inexpensive, with a list price of $99 and an introductory price of $49.95 through October. (Registered owners of XTree Gold can buy the Windows version for only $39.95.)

The main reasons to buy XTree for Windows are clear if you need file compression capabilities or a broad range of file viewers.

Otherwise, both Windows' File Manager and Norton Desktop for Windows, which includes several additional significant utilities, are better buys. In fact, many users are likely to find XTree Gold running in a DOS window more suited to their needs.

We find XTree for Windows to be a good value.

Patrick Marshall has 10 years of experience using and writing about a wide variety of PC software.

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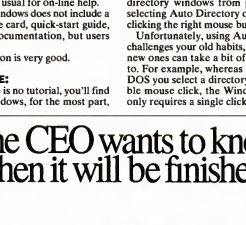

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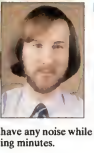

Buyers Advisory / Brett Glass

Silent 'keyboard skins' virtually eliminate laptop clacking noise

Q We are looking for a very quiet keyboard. We are using a PC in a courtroom setting, and we really can't have any noise while the clerk is recording minutes.

Bill Jorgensen

A Not long ago, I took a laptop computer to a seminar to take notes. Another person nearby was using an identical machine, but his keyboard made a loud clacking sound while mine was nearly silent. The reason: My laptop had a "keyboard skin" — a thick, rubbery piece of plastic — over the keys. One normally thinks of these accessories (available at stores and by mail) as a way to prevent damage from spilled liquids, but they are also great at absorbing noise.

I'd recommend that you visit your nearest computer superstore and select a relatively silent keyboard (many of the inexpensive "generic" keyboards are quieter than the name-brand models). Then add a matching keyboard skin and place a foam rubber typewriter pad underneath to eliminate conducted vibrations. This combination should nearly silence the keyboard.

Q I am buying a file server and want a very fast hard disk and a very fast Ethernet card. It looks like the best way to get a fast disk drive is to go local bus. But are there any Ethernet cards that are built for local bus?

Benjamin Toso

A I haven't been able to find any announcements of local-bus Ethernet cards. These cards will probably be announced later this year, at this week's NetWorld or next month's Comdex. If you can, you may want to wait.

If you have an immediate need for fast Ethernet, consider getting an EISA motherboard and a bus-mastering EISA Ethernet adapter. Because network traffic occurs in bursts, it's ideal for the EISA bus' burst mode.

As for your hard disk: Although a local bus interface will provide fast data transfer, it's not the only factor you should consider. Make sure that the hard drive itself is the fastest you can get, with a high spindle speed (to minimize rotational latency) and a Fast SCSI-2 interface.

If Maxtor's forthcoming MXT drives live up to their specs, they might be a good choice. These drives are billed as having an average seek time of 9 milliseconds, a spindle speed of 6,300 rpm, and a raw bit rate as fast as 44 megabits per second. (If I can arrange to test one, I will report the results in a later column.) Finally, make sure that your system includes a large hardware or software disk cache.

Q Is there a RAM-resident program that captures printer output to an ASCII text file?

Richard Bley

A There are many programs of this type available. For years, I've used one called LPT2DSK, written by George Bouche; it's available as the file LPT DSK.ARC in Data Library 3 of CompuServe's IBM Systems Forum (GO IBM SYS).

This program uses a very safe capture method that avoids many of the usual TSR conflicts: It spawns a second copy of COMMAND.COM and captures everything that's printed in a RAM buffer until you type Exit. The program then writes the contents of the buffer to disk. Because it doesn't try to access the disk while another program is running, it's compatible with every software package I've tested — including some troublesome ones such as the original SideKick.

Q In your last column, you failed to mention the DOS Mode command as a way of changing the keyboard repeat rate. Why?

Sandra Wellington

A You're right; DOS 5.0's Mode command lets you set the keyboard repeat rate. (I had been under the mistaken impression that you had to have ANSI.SYS loaded for this to work.) Check your DOS manual or type Help Mode at the prompt for more information.

Q I recently upgraded my personal computer to a new machine that uses SIMMs. My old one used SIPPs. Are there any adapters that would let me use the old memory chips in the new machine?

Ron Barak

A Unfortunately, there are no adapters available for converting SIPPs to SIMMs. Even if there were, the differences in timing requirements, refresh rates, and electrical characteristics between the old and new chips would make any such adapters prohibitively expensive. My recommendation: You should save the old motherboard, together with its memory, and use it for something else. Old PCs make fine fax servers, print servers, and voice mail systems.

Contributing editor Brett Glass answers reader questions on technical issues in this weekly column. Brett cannot answer questions personally. Readers can leave questions by calling (800) 227-8365, Ext. 702, or by messaging CompuServe (72267,3673)

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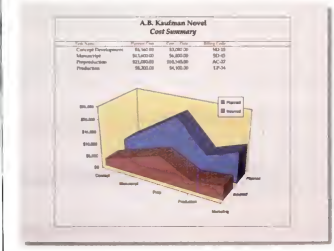

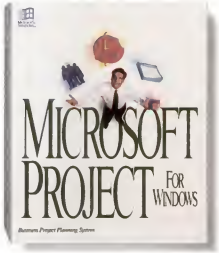

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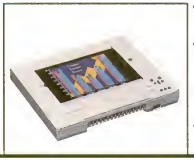

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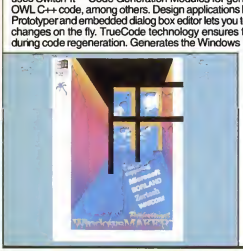

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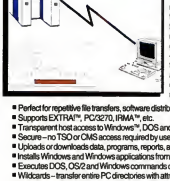

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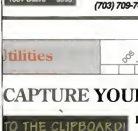

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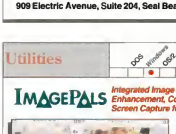

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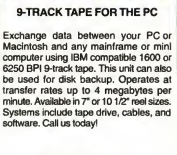

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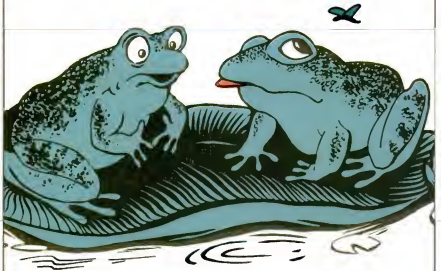

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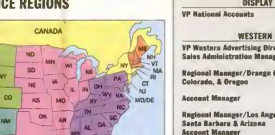

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SUPPORT / from page 1

Novell blocks free BBS support

user groups up to $1,500 per year for technical updates, and these groups could be banned from offering "free" bulletin board access to the data, sources said.

Novell officials concede they are working to limit users to getting support data from "licensed" fee-paying providers.

"We are going to make our license materials more readily available to our customers. We want our customers to have tested and approved fixes and patches from Novell, and we'll make them available through licensed partners," said Richard King, Novell's vice president of worldwide support services.

Currently, Novell has three licensees: CompuServe and General Electric, which have a per-minute charge, and Ziff Desktop Information Inc., which charges $1,500 per user for a year's support data from Novell and 30 other network vendors.

Those who weren't shutting down their service said they would have to increase their fees. 900 Support, a for-profit NetWare support firm that offers a free BBS to clients, this month will begin charging $100 per year, said Dan Mandel, 900 Support president.

"The big NetWare 4.0 sites are not likely to suffer, because they can afford it, or they'll get it free," said Rick Shafer, president of Creative Business Concepts, a Novell platinum reseller in Laguna Hills, Calif. "But the smaller sites are likely to see added costs." A platinum reseller books $250,000 Novell sales a year.

Novell officials denied that they have started excluding the nonlicensed BBSes. "Many platinum and gold resellers currently receive these materials free, and we have no plans to change that. But we never told them it would be a long term thing," King said.

ODBC / from page 1

ODBC moves across platforms

Pioneer will be the first to port ODBC to other platforms.

"There are three or four companies out there working very hard on Unix or OS/2 ODBC drivers," said Lowell Tuttman, senior product manager for ODBC at Microsoft.

Most of those vendors have yet to announce their plans.

Pioneer will begin beta testing a suite of 20 ODBC drivers for Windows in January, said Richard Holcomb, Pioneer president.

The suite, designed to give corporations one-stop sales and support for ODBC drivers, is scheduled to ship in the first quarter of 1993 "for about $200," he added.

Pioneer will provide access to data stored in dBase, Btrieve, Paradox, and popular SQL databases. Six weeks later, Pioneer plans to ship an OS/2 version of the suite, Holcomb said.

As the suites of drivers ship, Pioneer will upgrade its Q+E Database Library development package with ODBC support. In 1993 Pioneer plans ODBC drivers for the Mac and Unix, and will deliver Windows NT drivers the quarter after NT ships.

Pioneer is also creating ODBC servers for NetWare and Unix that will let DOS client applications access ODBC back ends with only a little code running on the DOS machine.

When asked if Microsoft will provide ODBC for DOS 6 or OS/2, Tuttman said, "We are not going to supply that kind of software. The kit is out there for people to implement drivers."

The driver in the ODBC SDK, which accesses dBase files, is for testing applications against the ODBC API, not for general distribution, Tuttman said.

KALEIDA / from page 1

To move IBM video server link

Intel/IBM DVI architecture, the server demonstration will show users that network video is a reality, even though IBM has not determined on what its network will be based.

Currently, IBM is working with Ethernet, FDDI, and ISDN technologies in an attempt to determine the most cost-effective solution. The server is expected to reach the market in the first half of 1993, the sources added.

XScript — Kaleida's first product, which is a combination of IBM's MediaScript, Apple's QuickTime, and Microsoft's Video for Windows — will connect the server to a network of PCs and Macintoshes.

XScript will provide the interface between IBM's AIX-based video server and Macintoshes and PCs running on the same network. Although the networking is expected to be easier as both Apple and IBM move to the PowerPC platform running under PowerOpen Unix, the XScript format will still be used for cross-platform compatibility, according to sources.

Although IBM remains committed to the DVI compression technology it codeveloped with Intel, and will use that as the basis for its server compression technology, it's unclear if Apple will increase its support of DVI. Apple will update its compression architecture on October 19 with QuickTime 1.5.

QuickTime can support DVI's compression algorithms, but Apple doesn't provide the support directly, leaving it up to third parties. Although that might hamper some of the cross-platform message Apple, IBM, and Kaleida want to present at Comdex, it's not a serious problem, some sources said.

"That's a capability that just about anyone could provide for the Macintosh," one source noted. "Kaleida could write the code, IBM could do it, Intel could do it. Apple doesn't have to be involved at all."

IBM / from page 1

Multimedia in all systems by 1994

machines, in that order," Corrigan said in an interview last week.

IBM will evolve the Micro Channel bus architecture over the next year or two to better handle multimedia applications, finally making appropriate use of that architecture's ability on the desktop. "The MCA machines will have a very strong role," Corrigan said. "It's not that [Micro Channel] wasn't important, it just didn't satisfy the demands of the full marketplace," he said.

Corrigan admits, however, that the upcoming Value Point line and other low-end, non-Micro Channel systems could account for as much as 70 percent of its unit sales.

Echoing the recent remarks of Apple chairman John Sculley, Corrigan said IBM is interested in competing in the market for hand-held devices but remains skeptical about the broad-based consumer appeal.

He believes many of the applications touted for hand-held devices are taken care of by smaller versions of existing portable systems.

"[Hand-held systems] are something we can do for a particular application," Corrigan said. "But where is the magic of a Personal Digital Assistant for you or me? It is sort of elusive right now."

Emphasizing this point, Corrigan said IBM's system engineers have used an internally developed "communicating assistant" as an information-retrieval device for field maintenance. "I have done a number of special bids on these for companies, but I don't see it as a consumer product," he said. "You are not going to sell 10 million of them."

IBM has a lot to learn about selling low-cost PCs by mail order, Corrigan admits. But he believes he can at least be competitive with mail-order pioneers such as Dell Computer Corp.

"I am not arrogant enough to think I can do something as well as someone that has been doing it for a while," Corrigan said.

IBM will back its soon-to-be-announced mail-order business with a broad-based build-to-order strategy. Not having such a strategy has cost IBM some business even among its larger accounts.

"I expect, for many reasons, to move my manufacturing operations to accommodate a high-volume, build-to-order plan that will be significant," Corrigan said.

Microsoft's planned retail pricing for Windows for Workgroups

Product name	Price	Customer
Windows for Workgroups	$249.95	DOS user
WFW add-on for Windows 3.1	$99.95	Windows 3.1 user
WFW upgrades for Windows 3.0	$149.95	Windows 3.0 user
WFW Starter Kit *2 Copies of WFW, 2 network cards, 2 T-connectors, 2 terminators, 25-foot coax cable, installation videotape*	$849.95	2 DOS users
User Kit	$424.95	DOS user
Add-on Starter Kit	$549.95	2 Windows 3.1 users
Add-on User Kit	$274.95	Windows 3.1 users
Workgroup Connection *DOS client for WFW and LAN Manager, DOS MS-Mail client*	$79.95	DOS user

Microsoft plans to offer a wide variety of options of Windows for Workgroups (WFW) when it ships on October 27. The basic WFW package includes Windows 3.1, file and printer sharing, Network DDE, MS-Mail, Schedule Plus, and network protocol support. Microsoft had no comment.

SOURCE: MICROSOFT DOCUMENTS OBTAINED BY INFOWORLD

PowerPoint 3.0 for the Mac mirrors version for Windows

By Kelley Damore

Macintosh users will receive a version of Microsoft Corp.'s PowerPoint this month similar to the Windows version that shipped in May.

PowerPoint 3.0 for the Mac will feature a toolbar, outliner, and an independent viewer for screen shows, said sources close to the company.

The program will also give users an extensive file interchange with PowerPoint 3.0 for Windows.

The program will use Microsoft's Object Linking and Embedding (OLE) technology, which lets users place objects created in other applications into their documents. The program requires System 7 and offers 35 TrueType fonts, sources said.

One beta tester said he appreciates the similarity between the Mac and Windows versions of PowerPoint. "Whatever you do on the Mac side comes over to the PC," said one beta tester, adding that the interface is virtually identical to the Windows version.

Other new features include an outline mode available to users in all views.

PowerPoint 3.0 will incorporate 160 sample templates that users can edit. Each PowerPoint template provides four masters that dictate separate defaults for charts, speaker notes, audience handouts, and outlines, sources said.

Other options include transition and build effects such as blinds, wipes, and fades, and drawing tools such as arrowheads, polylines, and free-form drawings. The program includes clip-art and a shape tool that draws common shapes such as cartoon speech balloons, triangles, arrows, and stars.

Text editing features, such as superscripting and subscripting options, and a smart quotes option are also included. A menu option lets users replace fonts globally in a presentation.

The program added chart options and can automatically generate bullet charts.

Microsoft declined to comment.

REVIEWS / TEST DRIVES

CAD SOFTWARE

DesignCAD Professional bundle saves money

Estimating and bid generating program proves useful; scanning program is useless

BY CAROLINE HALLIDAY
REVIEW BOARD

DesignCAD Professional is a $995 collection of CAD programs and utilities from American Small Business Computers. The package includes DesignCAD 2D, DesignCAD 3D, ScanPro, DesignSym Professional Symbols Library, and SmartEst Estimating Program, as well as three training videos.

DesignCAD 2D, Version 5.0 (reviewed July 29, 1991, page 69) is an average low-end two-dimensional CAD program. Among its best features is its minimal hardware requirements (it requires no math coprocessor and lets you print large drawings in sections and assemble them later). Its programmability is unmatched in low-end CAD programs because the tools are practical and do not require extensive programming knowledge. However, DesignCAD 2D is weak in symbol handling and hatching.

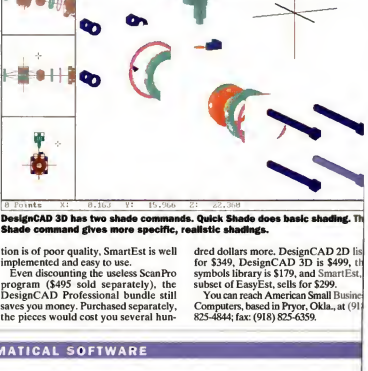
DesignCAD 3D, Version 4.0 is an average three-dimensional solids modeling program that supports box, cone, cylinder, hemisphere, and sphere-solid primitives. You can also create solids from any enclosed series of surfaces. You can create flat surfaces called planes, which are surrounded by straight lines, or you can create more complex surfaces.

Manipulating objects in a 3-D modeling program is often difficult, and though DesignCAD 3D includes the basics, it is not exceptional. You can establish a working plane and change the viewing angle in any viewport. Two sets of shade commands provide basic and more sophisticated shading.

ScanPro is a raster-to-vector conversion program. On the positive side, most CAD programs don't come with a utility program that can convert scanned images into CAD drawings. However, ScanPro is, simply, awful. In theory, it can convert from TIF, CUT, or PCX format into DesignCAD 2D or DXF format drawings. But it failed more often than it succeeded when I tried it.

DesignSym Professional Symbols Library has more than 6,700 useful predrawn symbols for interior design, landscaping, architecture, and engineering. Unfortunately, DesignCAD treats each symbol as a drawing (instead of as an instance that points to a symbol), which means each time you add another copy of a symbol, the drawing size increases accordingly.

DesignCAD 2D can take extracted attributes and create a Bill of Materials with the included utility program. DesignCAD Professional includes an additional database program from CMS Estimating, SmartEst, which you can use as an estimating and bid-generation program. Though the printed documentation is of poor quality, SmartEst is well implemented and easy to use.

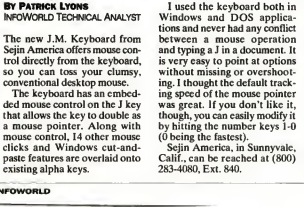


DesignCAD 3D has two shade commands. Quick Shade does basic shading. Th Shade command gives more specific, realistic shadings.

Even discounting the useless ScanPro program ($495 sold separately), the DesignCAD Professional bundle still saves you money. Purchased separately, the pieces would cost you several hundred dollars more. DesignCAD 2D lis for $349, DesignCAD 3D is $499, th symbols library is $179, and SmartEst, subset of EasyEst, sells for $299.

You can reach American Small Busine Computers, based in Pryor, Okla., at (91 825-4844; fax: (918) 825-6359.

POINTING DEVICE



J.M. Keyboard overlays 14 other functions onto alpha keys.

'J' makes a great mouse

BY PATRICK LYONS
INFOWORLD TECHNICAL ANALYST

The new J.M. Keyboard from Sejin America offers mouse control directly from the keyboard, so you can toss your clumsy, conventional desktop mouse.

The keyboard has an embedded mouse control on the J key that allows the key to double as a mouse pointer. Along with mouse control, 14 other mouse clicks and Windows cut-and-paste features are overlaid onto existing alpha keys.

I used the keyboard both in Windows and DOS applications and never had any conflict between a mouse operation and typing a J in a document. It is very easy to point at options without missing or overshooting. I thought the default tracking speed of the mouse pointer was great. If you don't like it, though, you can easily modify it by hitting the number keys 1-0 (0 being the fastest).

Sejin America, in Sunnyvale, Calif., can be reached at (800) 283-4080, Ext. 840.

MATHEMATICAL SOFTWARE

TK Solver 2.0 handles multiple-variable problems, is an excellent teaching tool

BY ALAN J. FRIDLUND
REVIEW BOARD

TK Solver is one of those rare packages that is both an excellent teaching tool and a way to get real work done. It was introduced more than 10 years ago as an equation solver for scientists and engineers, but it has evolved into a general-purpose numerical problem solver that is useful for much more. It is particularly suited to complex problems that involve many variables and systems of simultaneous equations.

Usually, these kinds of problems require specialized software, but with TK Solver, you simply provide the defining list of equations or problem-solving rules and provide values for your variables either from the keyboard or by importing a file (DIF, WKS, or ASCII format). If you don't have exact values for your variables, TK Solver can work with your best guesses and derive either a range of solutions or an optimized solution.

TK Solver solves problems in terms of "models" composed of rules (equations and logic statements). The models you develop become "objects" that you can save, recall and edit, or combine to form even more complex models. You can li your numerical results, expo them to a spreadsheet or CA program, or depict them as lin bar, or pie charts.

I was impressed by T Solver's speed, compactnes and documentation. I was le impressed by the sparta screen appearance and oc command stru ture.

The single-us version of T Solver 2.0 for t Mac or PC reta for $595; singl user upgrad are $195. Ne work versio are also ava able.

You can rea Universal Tec nical Systems, l cated in Roc ford, Ill., at (81 963-2220.

TK Solver's presentation view can combine data, results, and graphs.

PROGRAMMING UTILITIES

C-Debug, C-Verify spiff up C

Duo makes even the toughest bugs easy to squash

BY ROBERT A. DELROSSI
REVIEW BOARD

C-Debug and C-Verify are to your C code what polish is to furniture. Just as furniture polish doesn't do much for a marred surface, you won't use either of these tools until your code is just about right. At that point, C-Debug and C-Verify form a one-two punch that makes it easy to vanquish even tough-to-get-at bugs. They are not general-purpose debuggers, though. For that you will still need tools such as CodeView, Periscope, or Turbo Debugger.

C-Debug watches for bad pointer usage, and C-Verify makes sure that programs are tested optimally. And though either program has fancy screens and high quality manuals, both do their jobs exceedingly well.

Most C programmers know that curing pointer errors can be one of the most painstaking aspects of program development. That's because C, unlike other programming languages, offers tremendous flexibility when it comes to manipulating computer memory. C-Debug carefully watches every use of pointers and arrays in your program. When an error is detected, the program aborts and a message explains exactly what happened and where it took place.

After copying the distribution files to a subdirectory, you will need to create a function definition library for your compiler. It is this library that defines the characteristics of your compiler's standard library so that C-Debug can track memory use.

To build a C-Debug version of your code, you will need to start with source files that compile cleanly. Then you will run Pointer, a program that inserts calls to C-Debug throughout your source code. The output from Pointer is saved under a separate name so your files are preserved unchanged. You then relink your source files along with the supplied C-Debug libraries and run your program as usual.

What kinds of errors will C-Debug report? Here are some examples: attempts to use uninitialized pointers (including pointers that were freed earlier), copying more data into a memory block than was allocated (including such typical errors as copying over the end of a string), and failures of calls to allocate as much memory as was requested.

Programs, like a particular Robert Frost poem, are filled with paths that can converge and branch off. C-Verify can help by alerting you to paths that haven't received enough attention. Like C-Debug, C-Verify works by modifying a copy of your C source code. C-Verify outputs a set of files that mimic your code but includes calls to special routines. It also outputs a master file that contains every possible branch of execution your program could take. When your program is executed, a tag file is automatically created. The tag file details the branches you took as normal execution proceeded.

Then, using the VER_XREF program, you can compare the master and tag files interactively. Your unchanged source code appears in one window while the list of branches you missed appears in another.

The interactive environment includes a simple notepad so that you can make notes for your next round of testing (such as, "See what happens when a bogus menu item is selected").

Perhaps the only criticism I can levy against C-Verify is the number of steps it takes to get to the interactive environment. Batch files can go a long way to improve the product's overall usability.

The DOS version of C-Debug lists for $249; C-Verify is priced at $395. In addition to most of the Unix platforms, both products also work on VAX VMS.

Softran, in Naperville, Ill., can be reached at (800) 462-3932 or (708) 505-3456; fax: (708) 505-4232.

CD ROM PRODUCTS

Two for CD ROM: Cinemania, Bookshelf

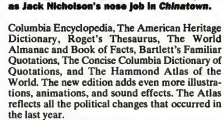
BY PATRICK MARSHALL
CONTRIBUTING EDITOR

Do you have been searching for a reason to justify buying a CD ROM player, Microsoft Corp. has just provided two: Cinemania and a new edition of Bookshelf for Windows.

Cinemania offers more than 19,000 short reviews and 745 full reviews on movies new and old. The technology doesn't exist for film clips yet, but there is plenty of the next best thing: more than 1,000 still photographs and 86 sound bites. You can even see a shot of Bogie with the Maltese falcon and hear some of his famous lines.

There are also several thousand biographies of actors, actresses, directors, and other film personalities, including complete lists of films to their credit. And, of course, it's easy to search the database — for movies, biographies, and entries with photographs and/or sound. At $79.95, Cinemania costs more than a couple of movie tickets, but it also provides many more hours of entertainment.

Last year's Bookshelf for Windows was one of the few "must buys" for CD ROM owners. This new version, which also lists for $195, is even more attractive buy. It contains the same set of reference books — including The Concise

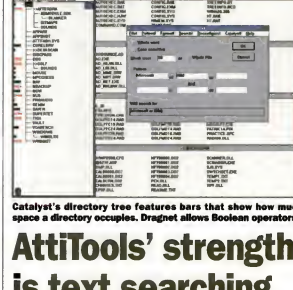


Cinemania shows stills of movie scenes, such as Jack Nicholson's nose job in *Chinatown*.

Columbia Encyclopedia, The American Heritage Dictionary, Roget's Thesaurus, The World Almanac and Book of Facts, Bartlett's Familiar Quotations, The Concise Columbia Dictionary of Quotations, and The Hammond Atlas of the World. The new edition adds even more illustrations, animations, and sound effects. The Atlas reflects all the political changes that occurred in the last year.

Microsoft, in Redmond, Wash., can be reached at (800) 426-9400.

DOS UTILITY



Catalyst's directory tree features bars that show how much space a directory occupies. Dragnet allows Boolean operators.

AttiTools' strength is text searching

BY PATRICK MARSHALL
CONTRIBUTING EDITOR

AttiTools, Version 1.0 aptly illustrates the old adage: United we stand, divided we fall. None of the individual tools in the Attitash Software Inc. collection, with the possible exception of the text-search utility, is the strongest on the market. However, as a group, AttiTools represents a handy set of utilities with a very affordable price tag of $49.95.

Of the four major utilities in AttiTools, Catalyst is probably the main reason most users will buy the package. This cleanly designed file manager offers a directory tree on the left, file panels on the right, and most of the basic file management capabilities. There are also some unexpected features, such as bars that appear alongside directories indicating how much disk space the directory occupies. Catalyst also lets you compress files into archives and encrypt them.

The most interesting utility is the file-search tool, Dragnet. Dragnet does basic searching, such as scouring your drive for all files with a given extension or searching files for specified contents. Unlike most other text-search utilities, however, Dragnet is not limited to searching for character strings. You can also use Boolean "or" and "and" arguments to find files containing combinations of terms. You can then view the retrieved files or send them to Catalyst to work on.

AttiTools supports viewers for a rather limited number of word processing, spreadsheet, and database formats: ASCII, Microsoft Word for Windows, WordPerfect, Excel, 1-2-3, and dBase. However, for graphics files, the program's support is surprisingly broad, including BMP, CGM, DRW, GIF, PIC, PCX, and TIF.

DiskSpace tells you which files are hogging space on your hard drives. This utility displays a bar chart showing what proportion of your files on a selected drive are EXE, COM, DOC or any other file type. You can also "explode" a given file type and see a chart displaying how many files of that type are of a given size. As interesting as the charts are, they are not terribly useful; you generally either want to keep certain file types or you don't.

SlingShot is a curious little program launcher that consists of a single bar with a pull-down menu listing your Windows application groups and a row of buttons listing each program in the group. (AttiTools also sells this utility as a stand-alone program.) If you have more groups and programs than the on-screen menus can hold, SlingShot is a handier way to access them than Windows.

Though AttiTools' utilities are somewhat integrated — especially Catalyst and Dragnet — you will quickly realize that you are dealing with a collection of separate tools that have been patched together. There is some duplication of functions, and in some cases, one utility provides a function that more appropriately belongs in another utility.

In short, AttiTools has some nice touches, and its text-search capabilities may be very appealing to some users. However, the program definitely needs some polishing before it will represent a serious challenge to the better-known file management programs.

Attitash Software, in Nashua, N.H., can be reached at (603) 882-4809.

Fox founder eager for joint projects with Microsoft

The face of the PC database market has changed so much that it is tough to tell the players without face cards. Fox Software, the scrappy start-up that gave Ashton-Tate pains in the accelerator, was bought by Microsoft Corp. three months ago. Ashton-Tate, the erstwhile leader of the PC database world, was bought by Borland International Inc. last year. To round out the picture, Computer Associates International Inc. bought Nantucket Software, publisher of Clipper. Meanwhile, Rbase struggles to hang on to its independence.

So today, Dave Fulton — the founder of Fox Software and architect of FoxPro — finds himself smack dab in Redmond, Wash., and part of a multibillion-dollar company. As the ads say, you've come a long way, baby.

Fulton, now Database Architect at Microsoft, talked to InfoWorld *Editor at Large Scott Mace about the future of FoxPro, as well as Microsoft Access.*

InfoWorld: Are FoxPro for Windows and Microsoft Access going to merge into one product?

Fulton: I think the term merging is inappropriate. What we're really talking about is shared technology between the products. If we take the best database talents on the Fox side and the Access team and combine them to create an engine that can be used by both products, we can wind up with a stronger result. Both products will continue to do what they've done all along, but under the covers there may be a unified engine that is presenting a Fox-style appearance to the Fox client and an Access-style appearance to the Access client. We're not talking next year, of course. It's a long-term design goal.

InfoWorld: People should not be afraid that one or the other product would be discontinued?

Fulton: Absolutely not. Microsoft is many things. Irrational it is not.

InfoWorld: Recently, you described the current performance of FoxPro as having one hand tied behind your back. What's in the other hand?

Fulton: More performance, of course. If you go to a Windows NT kind of multi-threaded environment, multithreading can be a big win for database programs. That's well known . . . [you can] in some cases get two-to-one performance advantages by taking advantage of multithreading. There are lots of things that can be done. They're not deep technological secrets. They're well-known technologies.

InfoWorld: Will we see some of that in FoxPro 2.5?

Fulton: No. Version 2.5 has something that we're calling internally "Son of Rushmore." There is an extension of some of the Rushmore ideas to some new areas that is picking up some very substantial performance improvements in areas that are vital.

InfoWorld: Are you beginning to outline a 3.0 product at this point?

Fulton: Well, I've been attracted to some of the things suggested by users. Certainly, object-oriented, event-driven programming language extensions are a very hot item. Of course, that's all intertwined with the current ANSI [XBase] standardization effort, because we certainly would not want to do something if it's within our power that's different from the ANSI standard. But nevertheless, that's clearly something many users are interested in.

InfoWorld: Some people think the ANSI committee won't get around to tackling such a tough topic for another year or so. If that were the case, would you feel compelled to go ahead and do something?

Fulton: Well, I think we'd have to go ahead and do something. You can't ignore what customers are asking for. There's a very strong groundswell of interest in object technology.

InfoWorld: Will you have a version of FoxPro 2.5 for Windows NT?

Fulton: Certainly you'll be able to run the Windows product under NT. Whether there's one that takes advantage of Windows NT technology before 3.0 . . . probably not.

InfoWorld: Is there a friendly rivalry between FoxPro and the Basic folks at Microsoft?

Fulton: Not at all. We view the Visual Basic team as a source of inspiration. They've taken developmental tools very far. I like particularly the way the debugger's integrated with code fragments. There's no question that we're going to follow Visual Basic's lead in enhancing our own developer interfaces. Visual Basic also has a very expressive and well-accepted set of event-driven programming primitives. Ultimately our goal is to make language a matter of personal choice.

InfoWorld: Have you looked at Cairo yet?

Fulton: I've met with Jim Allchin, more or less socially. He demonstrated for me work in progress. I was most impressed with the sophistication and design of Cairo. The potential of Cairo is one of the most deeply exciting things I've seen at Microsoft.

ONE ON ONE

David Fulton
Founder, Fox Software
Database Architect
Microsoft Corp.
Redmond, Wash.
Age: 48

Notes From the Field / Robert X. Cringely

FTC hams it up in Redmond; looks like it's going to be curtains for Bill

Forty-three stories above West 57th Street, far enough up in the world for New York to actually seem beautiful, I sat for an hour last week with Mickey Schulhof, the very un-Japanese guy who runs Sony's U.S. operations. We talked about computers and why Sony hasn't been very successful in the PC business (Sony underestimated the importance of software standards, Schulhof said). And he confirmed for the record that Sony owns 5 percent of General Magic, the Apple spin-off that hopes to turn phones into computers.

But the best part of sitting with the guy who bought CBS Records and Columbia Pictures was learning what it *really* takes to get to the top at Sony.

You have to be a ham — an amateur radio operator.

When we think those guys are playing golf or plotting world domination, they are actually down in the basement, warming up their two-kilowatt rigs and practicing Morse Code.

I'm not kidding.

A VERY EXCLUSIVE CLUB. Every organization has its implicit standards for getting ahead. At Microsoft, for example, it looks like naked aggression (which is different

from being naked and aggressive) is the E ticket.

The Federal Trade Commission reportedly dropped by Redmond late last week to disclose that it had found Microsoft's business practices to be *exclusionary*, which means that they were aimed more at hurting Microsoft's competitors than at helping Microsoft. Exclusionary practices are a no-no, and I am told Bill Gates was offered the choice of door number three (signing a consent decree) or what's behind the curtain (going to court).

Bill will take the curtain, I'm sure.

Why not just say "Oops!" and sign the damned piece of paper, promising not to do that stuff anymore? Because it would risk hurting Microsoft's momentum in the market. While the kids in Redmond learned the new rules, some competitor might gain an advantage. Better to spend 20 years and $100,000 per month fighting the case in court.

MEDIA MADNESS. Not that Microsoft has much to worry about, given the state of its competition. We already knew that you couldn't buy a copy of OS/2 2.0 from IBM with a check or purchase order, but word came last week from Desert Storm forces still stuck in Saudi Arabia that Big Blue won't ship OS/2 to an APO address, either. Oh, they'll charge your credit card, but they won't ship product.

That's the IBM stuff that's (sorta) shipping. What's upcoming are multimedia extensions for OS/2, going into beta in November and shipping in mid '93. This includes pen support and Software Motion Video, which is like QuickTime.

Trying to prove that it is serious about multimedia, IBM will show a pair of PS/2s at Comdex with DVI on their motherboards. This will be billed as a *technology demonstration*, but look fo this stuff to go in the Premium line nex year and the ValuePoint in '94.

Also in 1994, we'll finally see OS/ 3.0, which will use the Mach kernel fo both its server and desktop implementations. At least that's the plan.

LAME, HE SAID. All else is chaos. Want to buy extra 120-page manuals to go wit your cc:Mail for Windows Platform Pack? A 25-user software upgrade cost $845, but the manuals (after the first one cost $80 each — a total of $1,920 "Complain to Lotus," say the beles guered cc:Mail phone reps.

Then there is Borland, whose Spanis operation is cleverly sending matches i the mail to prospective customers. Mayb they should spend time getting Quattr Pro for Windows to run (really run) in les than 6 megs, or to read files created wit Q-Pro 4.0's .WQ! compressed format.

"What does it take to get ahead a *InfoWorld*?" asked Pammy. "Tattoos?"

I'm born to raise Hell, but call m anyway at (415) 312-0555; fax: (415 326-0326; cellular: (415) 699-5081 MCI:CRINGE, or cringe@infoworld.com

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They say you can't get good chili in Hong Kong. Apparently Dell® couldn't find a 486™ color notebook there either. But just because they settled for 386SL™ power is no reason for you to. Especially when there's the American-built ALR® Ranger MC486. The ALR Ranger MC486SX/20 gives you 20-MHz i486SX™ power for only 50 dollars more than Dell's system. And that's just the beginning of the ALR advantage.

RANGER'S SUPERIOR PERFORMANCE

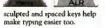
RANGER'S EXPANDABILITY
ALR includes a variety of internal expansion options. You can plug in FAX/Modem modules, SCSI adapters, even Ethernet network interfaces. Some desktops don't offer this much expandability! Dell, on the other hand, has just one internal modem slot. Likewise, the ALR Ranger MC486 has room for up to 16-MB of memory. Dell tops out at 12.

RANGER'S UPGRADEABILITY
The ALR Ranger MC486 is modular. By simply swapping CPU modules, you can quickly upgrade to 25-MHz i486SX or i486DX™ power. Dell, unfortunately, doesn't offer a modular upgrade path. Of course, there is one way to upgrade the Dell notebook; sell it and buy an ALR Ranger MC486.

RANGER'S POWER MANAGEMENT
ALR's Advanced Control™ software works with a dedicated power management microprocessor to give the Ranger MC486 over four hours of possible battery life. A detailed on-screen status display provides accurate, up-to-the-minute battery information. Dell's monitoring system (a warning beeper), is considerably less sophisticated.

RANGER'S BATTERY RECHARGE TIMES
The ALR Ranger MC486 recharges in about two hours, whether or not you're using the system. The Dell takes 3-and-a-half hours to recharge with the system off. And you can pretty much forget about recharging the Dell system while it's running. So much for working efficiently.

RANGER'S HUMAN INTERFACE
When you're on the road, you need to be flexible. The Ranger MC486's full-tilt display can adjust to any lighting or work space. Dell's display can't go beyond 90 degrees. And ALR's fully



sculpted and spaced-keys help make typing easier too.

RANGER'S DOCKING STATION
With the optional ALR Ranger Docking Station, you can quickly turn this powerful notebook into a full-featured desktop PC - complete with three ISA expansion slots and four drive bays. We'd like to compare our docking station to Dell's, but we can't. Unfortunately, Dell doesn't build a docking station.

486-based ALR Ranger M486 Monochrome models start as low as $2499

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